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*Thomas Munro.*

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Printed 1927









**A**  
**COMPENDIUM**  
**OF**  
**MODERN HUSBANDRY,**  
**PRINCIPALLY WRITTEN DURING A SURVEY**  
**OF**  
**SURREY**

Made at the desire of the Board of Agriculture;

*Illustrative also of the best practices in the neighbouring Counties,  
KENT, SUSSEX, &c.*

IN WHICH IS COMPRISED

**AN ANALYSIS OF MANURES**

Shewing their Chemical Contents, and the proper application of them  
to Soils and Plants of all descriptions.

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Exhibiting a view of the increasing scarcity of, that important Article, with  
Hints on the Means of Counteracting it;

TOGETHER WITH

**A VARIETY OF MISCELLANEOUS SUBJECTS**

Peculiarly adapted to the present state of the Internal Economy of the  
Kingdom.

---

**BY JAMES MALCOLM,**

*Land Surveyor to their Royal Highnesses the Prince of Wales,  
and the Dukes of York and Clarence.*

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**VOL. I.**

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Argumentum locuples habui. Strada Prolog. Acad.  
Res spectatur non verba. Cic.

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**London:**

**PRINTED FOR THE AUTHOR, BY C. AND R. BALDWIN,  
NEW BRIDGE-STREET,**

**1805.**



Stephen Spaulding mem. coll.

MS. A. 9. 2  
6-21-1805

3 vol

TO HIS ROYAL HIGHNESS

MS. A. 9. 2 (4)

THE DUKE OF YORK,

&c. &c.

---

IT is now some years since your Royal Highness did me the honour to appoint me one of your Land Surveyors, in the course of which period, I have been so fortunate as to maintain your good opinion in my private capacity, and to have been honoured with your especial approbation, as Commander in Chief, for my humble endeavour to render a service to my country in a public situation, at a period when every man's services were likely to be called forth. In receiving such a testimonial from, and in being permitted to dedicate these volumes to, so illustrious a character, my ambition has attained its highest wish, and my only hope for this condescension is, that they may be found worthy of your patronage.

Your Royal Highness's

Most devoted Servant,

JAMES MALCOLM.

EAST GRINSTEAD,  
Oct. 1, 1805.



# THE HISTORY OF THE CITY OF BOSTON

BY  
JOSEPH NEALE

THE HISTORY OF THE CITY OF BOSTON, FROM THE FIRST SETTLEMENT TO THE PRESENT TIME. BY JOSEPH NEALE, ESQ. OF THE BARR. AT LAW. IN TWO VOLUMES. VOL. I. LONDON: PRINTED BY J. JOHNSON, ST. PAULS CHURCH-YARD, 1790.

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## PREFACE.

---

**I**N the Report on the Agriculture of the County of Surrey, drawn up by the desire of the Board of Agriculture in the year 1795, in which I was assisted, in no inconsiderable degree, by the great experience and universal practical knowledge of a much respected parent, and in some measure by a younger brother, I had the honour of pointing out the views which influenced that honourable Board to the undertaking. In every part of that wide extended county, into which I found it necessary to go, I took every opportunity to convince the freeholder and the tenant, that nothing hostile to their interests was intended, by the inquiry which we were then making. I endeavoured, by every argument in my power, to satisfy them that the intentions of the Board were only to examine the quality of the cattle, for the sole purposes of melioration; to notice the particular practices of each hundred, as their ploughing, seeding, harvesting, &c.; the quality of the soils, the manures, &c. &c.; in short to submit hereafter to their discretion and judgment, such improvements in

either, or all, as should appear requisite from an attentive examination of all the particular practices in each branch of husbandry throughout the county. With whatever force of reasoning these assurances were offered to their consideration, (and with many of the farmers whose knowledge could not be questioned, we had been long intimate) certain it is that there was an almost universal backwardness in communication. Whether this proceeded from the novelty of the subject, or from the natural shyness of their character, and an habitual dislike to furnish information upon such subjects, or whether the number of the queries that were put to them, gave them any suspicion that they were likely hereafter to be affected in some way or other by answering them, is no otherwise material, than that it serves to account in a certain degree, for the imperfections of the former report.

My profession constantly carrying me through various parts of the county, as well as various parts of the kingdom, I trust, I have, by attention and perseverance, surmounted the difficulties I experienced in the former report, from this backwardness of individuals to afford information.

It might have been wished, perhaps, for the advantage of agriculture, that the task of drawing out such a report had fallen into the hands of some one among the very many able men, with which

Surrey, as well as every county, abounds. Men whose leisure, scientific, and practical knowledge of agriculture, highly qualify them for such an undertaking: and that long ere this, we should have been favoured with their observations; but finding (after a period of ten years, since that report was published, and when those of some other counties have been revised and reprinted,) that no other report of this county was in agitation, at least with the assent of the board, I thought I could do no less than come forward to correct those errors in the former report; to include such parts as were either omitted, or only slightly touched upon; and to make the present work not only as comprehensive and complete as the nature of the subject would permit, but as forming the foundation for a more perfect system of husbandry in general.

It will presently be seen, upon comparing the two Reports, that the agriculture of this county has undergone perhaps the greatest change that it was possible for any science to undergo, in such a space of time, highly to the credit of those concerned in it. They appear to have abandoned those contracted notions which their predecessors had imbibed, and to have launched out into a system of improvement, which, while it materially enriches them, also greatly increases the common stock, and tends to prove, more than all the publi-

cations in the world, what each county is capable of effecting. It also awakens in the mind of the enlightened farmer, a strong desire for extending this knowledge; which, but for the exertions I have alluded to, would have continued enveloped in the same darkness, in which it had remained for ages.

Having visited France in the autumn of 1809, for the purpose of observing their system of agriculture, of examining their flocks, and their herds, I feel no difficulty in congratulating my countrymen on the vast superiority of their management in all the details of the science: at the same time, I must do the French the justice to say, that they are making rapid advances in the melioration of their fleeces, without regarding the improvement of the carcass; and that they bid fair to rival the best Spanish wool. A very ingenious worthy gentleman, one of the professors, and member of the National Institute, the Abbé Tessier, whose learning, and whose exertions do honour to his country, to whom I am indebted for many personal civilities, shewed me several specimens of wool of different crossings, and also a coat manufactured from one of the last; which in softness and quality was equal to the finest Spanish wool. As it is well known that the habit and mode of living of the French requires much less animal food than what is required in England, perhaps this attention to

the fleece, without regarding the carcass, may be prudent; their object is, certainly, to rival our staple manufactory. As their climate assimilates so nearly to that of Spain, and as the ingenuity of the French is conspicuous in every thing which they undertake, I see no reason at all to doubt their being able to accomplish their purpose, so far at least, as to produce a very improved commodity, both in wool and cloth; for besides that which M. Tessier shewed me, as the produce of his own flock, some of the cloth that was publicly exhibited at the Louvre, on the five complementary days in September 1802, clearly proved to what perfection they have brought that manufacture. Their Board of Agriculture, to which I had the honour to be introduced, and to attend some of their meetings, whilst I remained at Paris, is composed of several well informed men, whose exertions are warmly seconded by Mons. Chaptal, the Minister of the interior; they are enthusiastically bent upon the improvement of their country; for which purpose Messrs. Husard and Parmentier, and the Abbé Gregoire, came over to England. The language which, on their return, they publicly held out to their countrymen, of the state of the agriculture of those counties which they saw, was as flattering to us as a nation, as it was honourable to them as individuals. It shewed their candour, their discrimination, and their zeal to

promote a like exertion among their own people; but they have almost insuperable difficulties to surmount, which must be removed before they can effect so great an improvement. As the discourses which were made, and which I have alluded to, were delivered in public, and as they point out some things, which may be useful to us, I shall endeavour at some future day to digest them, and put them into an English dress.

——— *Fas est et ab hoste doceri*———

OVID, *Met. lib. iv. v. 428.*

In contemplating this science, it is astonishing to mark the very slow progress which, of all others, it has made, towards attaining even the little perfection to which it has arrived at this day. When we consider agriculture in the relation which it bears to our immediate existence, it is the more to be wondered at that its progress towards perfection should have been so slow. For, from the earliest periods of history, we find that in all times it occupied the particular attention of the greatest princes, and the wisest philosophers; it not only occupied their attention as governors, but they shewed a natural inclination to cultivate the earth, as a relaxation from the more arduous concerns of state affairs. We learn that the greatest converted their swords and their spears into ploughshares and pruning hooks; we find them retiring from

the splendid retinues of a court, and the active scenes of war, to enjoy the comforts and repose of an agricultural life. We read that husbandry was not only eagerly pursued as a species of amusement by many kings, but that more than twenty have condescended to adorn the subject with their writings. Dryden in his Preface to the *Georgics* says, "that it was commonly known that the founders of three of the most renowned monarchies in the world were shepherds." So backward was the state of agriculture in England, that Voltaire, in his *Thoughts on the great Benefits a Nation receives by giving due Encouragement to Philosophers*, has the following remarkable passage: "It is very certain, that if you circumscribe genius within narrow limits, you will soon bastardize an entire nation. What was England before Queen Elizabeth, when authority enforced the pronunciation of the epsilon? England was then the last of polished nations, in regard to useful and agreeable arts; without any good book, without manufactures, regardless of *agriculture*, and very weak even in her marine; but when genius was suffered to soar boldly adventurous, the English had Spencers, Shakespeares, Bacons, Jonsons, and lastly Locks and Newtons. It is well known that all arts are sisters, and that by giving light to each other, they become productive of an universal light. It is by these mutual helps that the genius



of invention is gradually communicated; thereby philosophy assists politics, affording new views for manufactures, finances, and the constructing of ships; thereby the English have arrived at greater perfection in cultivating the ground, than any other nation; and have enriched themselves by the science of agriculture in as great a degree as by that of the marine. The same enterprising and persevering genius which makes them manufacture stronger cloths than ours, influences them in like manner to write more profound books of philosophy. They walk more steadily and farther than we do in the same career; they dig down a hundred feet into the ground of which we only skim the surface." If Voltaire's assertion with respect to the state of agriculture before Elizabeth is correct, it will shew that since that period, which is exactly two hundred years, England was arriving at that climax in its agriculture, of which he takes such particular notice; and that in the last forty-six years, which is the time since he asserted that fact, agriculture has made a more rapid progress towards perfection than during the period of two preceding centuries, a circumstance highly honourable to the present race of farmers. Nor need we be at all surprized at it, when we find our most beloved sovereign filling up those hours of relaxation, which he can spare from the more important concerns of the state, in an attentive observance of

the progress of the royal farms. We see him affording every possible encouragement to whatever relates to the science, contributing in a very considerable degree to the improvement as well as to the increase of the stock of the kingdom, and setting thereby a most laudable example to the great men about him. Long may he live to enjoy the fruits of such philanthropy; for truly may he say in the language of Cicero "omnium rerum ex quibus aliquid conquiritur nihil est Agriculturâ melius, nihil uberius, nihil dulcius, nihil homine nihil libero dignius."

The antiquity of husbandry is a point upon which all are agreed, it was the necessary consequence of the fall of our first parents, who being driven out of the garden of Eden, were obliged to betake themselves to husbandry for their support; a support which is now become the favourite pursuit of all ranks: it is a pleasure of the greatest, and a care of the meanest, and indeed an employment and profession for which no man is too high nor too low. He who follows this employment with a mind full of equability, and undisturbed by the prevailing passions of the times, will feel the most exquisite delights. He will have no desires or fears, and none of the perturbations of mind and thought which passions raise: he can range his farm, and enjoy the pleasures which his flocks, or his cattle, or his crops afford; satisfied with a little

rather than possessing much, and living in temperance rather than in gratifying his senses.

————— Leve fit, quod bene fertur, onus.

If he is desirous to pursue the science of Agriculture through all its mazes and intricacies, he will find a source of inexhaustible pleasure. By analyzing the various soils with which every field on his farm abounds, he will precisely know their several qualities; by pursuing the same steps with his manures, he is at once furnished with the knowledge of that which is most likely to correct the extravagancies, and to improve the deficiencies therein, in the same manner as the skilful physician, by his knowledge of the anatomy of the human body, and a perfect acquaintance with the operation of certain drugs, is able to perfect the most surprising cures. Nor will he stop here, his mind at once inquisitive from what it has already acquired, pursues its course through the vegetable and animal kingdoms; he examines their mechanism, he discovers the causes of their operations, and he is enabled to draw conclusions and inferences as the result of his investigations.

In reviewing what he has examined in these particular sciences, he traces out the most wonderful dependance which they have on each other; he finds that there is a certain concatenation in the whole system of which he was not before aware,

and that the dissolution of one of these links would be the inevitable destruction of the whole.

From the various products of the earth, he sees not only the comforts, but the elegancies of life, in every thing we wear, in every thing we use, and in every thing we eat; but the soil without some element to animate it and set it in motion, would be a perfect *caput mortuum*. One of these elements, therefore, he finds to be water, it pervades and expands the soil, and enters into contact with its particles. It softens the arillus of the seed, enabling the plumula to ascend, and the rostellum to descend. It feeds the roots, it penetrates the minutest of its organized tubes, and finds a passage through meanders too small for the eye to discover, too numerous and intricate for the imagination to follow. It conveys a part of the nutrimental stores of vegetation, from the lowest fibres that are hid in the earth, to the very uppermost twigs that wave in the air. Nor is this its only use, it exhilarates the adjacent country by its humid train, furnishing sources of comfort to man and beast as it passes along, it receives all the impurities of the country, and by giving a brisk impulse to the air, prevents the unwholesome tendency of such a mass or the stagnation of its own vapours.

Without light or heat, this element would be of little use; he therefore considers the operation of the latter element, conjunctly with air (the third

element) upon the vegetable and animal system, and having called in aid a knowledge of chemistry, he is imperceptibly led into the whole science of natural philosophy, by which he acquires such a fund of useful information and such a variety of amusement, as no other study can procure; thus informed, and thus improved, he is never at a loss to fill up his time in the most rational manner, because he receives a pleasure in it, which to others would be deemed misery.

In detailing the process of Agriculture, and the several subjects which are connected with it, either mediately or remotely, and in offering such sentiments as appeared to me to apply to them, whether I have been fortunate enough to throw any new light upon them, or whether I have been able to exhibit them in as clear and conspicuous a manner as they might have been, I am unable to determine. I have endeavoured to compensate for the want of talents, by attention and assiduity; and such as the work is with all its faults, I must leave it to that Public, to whose candid and impartial tribunal I submit with every possible degree of deference.

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# EXPLANATION

OF THE

## COLOURS ON THE MAP OF SURREY,

(FACING THE TITLE PAGE.)

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**THE DARK PURPLE** bounded with a red line denotes the dark sandy districts.

The **PALER PURPLE** denotes the light sandy district.

The **YELLOW** are the loamy districts.

The **STRAW COLOUR** marks the ferruginous or clayey districts.

The **SMALL PINK PATCH** is the red sand about Ryegate.

---

### REFERENCE TO THE PLATES.

- I. *Map of the County of Surrey, Vol. I. facing the Title.*
- II. *The Dorking Lime Kilns . . . . . Vol. I. Page 52*
- III. *The Merstham Lime Kilns . . . . . ib.*
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|------|-----|---------|-----|----------|------|------------|
| Page | 9   | line 14 | for | Mitcham  | read | Mickleham. |
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# AGRICULTURE

## OF THE

### COUNTY OF SURREY.

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#### INTRODUCTION.

**T**HE county of Surrey is altogether inland, but its agriculture, manufactures, and its commerce derive the highest advantages from its situation with regard to the river Thames, which conveys the produce of its neighbourhood to the great market of London, and preserves the fertility of that neighbourhood by the immense supply of manure from the capital. This river is the boundary of the county on the north, dividing it from Middlesex, and running in a north west direction for 20 miles, till it meets the county of Berks at Windsor; its banks all the way enriched by the seats of the nobility and gentry. On the west it is bounded by Hampshire, at Frimly, Aldershot, and Farnham; (which last place is situated in both counties:) on the south by Sussex, where it meets that county at Felbridge water near East Grinstead, by the Sussex Oak upon Lovel heath, at a little distance beyond the 31 mile stone on the Capel road, and at a small distance beyond the 43d mile stone at Haslemere. It is divided

on the east by the county of Kent, along which it runs from the Thames through the Borough of Southwark, by Norwood, Penge common, Addington, Taatsfield across the Medway to Wilderwick, in the parish of Lingfield, where it terminates. Its greatest length from east to west is about 39 miles; its breadth from north to south about 25 miles; its circumference 146 miles, and considered as an oblong square it contains 481,947 statute acres. In it are 13 hundreds, having 140 parishes and 11 market towns, of which the principal are Guildford, Kingston, and Croydon, (they are also the places where the assizes for the county are held,) the inferior ones are Farnham, Reigate, Dorking, Haslemere, Godalming, Chertsey, Ewell, and Epsom; but of these inferior ones, the first three are by much the largest. At Croydon, Ewell, and Kingston the three greatest cattle fairs in the county are held. The first is a very large one, and is held at Croydon on the second day of October, for lambs, sheep, horses, a few neat cattle, many store hogs, and a prodigious number of walnuts; the quantity of which will appear under the article of Walnut, among the timber. It is also remarked for being the most genteelly frequented fair in England.

Ewell fair is held on the 29th of October, and is a very large fair for lambs, Dorset ewes, and other sheep; there are some cows, few neat cattle, many saddle horses, and but few cart horses, and some store hogs. Kingston fair is held on the 13th of November, and is considered a very large fair for neat cattle. Very large droves of Welsh, Scotch, Irish, and midland county cattle are brought; and hence the Kent, Sussex, Essex, Surrey, Hampshire, Hertford-

shire, and Bedfordshire farmers supply themselves with such as they may want. There are also a great many sheep and lambs, many saddle horses, and a good supply of cart and waggon horses; together with an abundant stock of hogs from Berkshire and other neighbouring counties.

Guildford is the county town, and was once the seat of the South Saxon kings; and it is generally admitted by most of our historians, that it was in this neighbourhood that Godwin, Earl of Kent, caused to be murdered those unfortunate Normans who accompanied Prince Alfred to England. It is a place of considerable inland trade.

Godalming is a place increasing daily in its manufacture of hosiery, and it is here that the fleecy hosiery is made, Messrs. Holland, Waistell, and Horton having established a very considerable manufactory for that purpose.

Wonersh, which is now only a village, and near to which Lord Grantley has a seat, was formerly famed for its extensive manufactory of cloth, which was exported principally to the Canary Islands; but an over covetousness induced the manufacturers to strain their cloth farther than it would fairly bear, which of course so injured the reputation of it that they lost their customers, and the town dwindled away to its present state.

Farnham was formerly a place of some trade; it is now only famed for its hop gardens, of which a due account will be found under the article of hops.

Kingston was anciently the place where the Saxon kings were crowned, and from this circum-

stance it derived its name of Kings-town. It is now conspicuous for its malting.

Near Egham, on the north side, lies the famous Runneymead, in which the liberties of England were secured by Magna Charta granted by king John; and on the west of this meadow rises Cowper's-hill; whose delightful prospect is the subject of one of the finest poems, which has appeared in the English tongue, written by Sir John Denham.

Chertsey is no otherwise remarkable than for possessing the exclusive privilege of being exempted in common with its immediate hundred from the jurisdiction of the high sheriff of Surrey, who must direct his writ to the bailiff of it. This officer is appointed for life by Letters Patent issued from the Exchequer.

Richmond, on the banks of the Thames, is perhaps one of the most beautiful spots in the world. It was for many years the residence of royalty, and of the principal nobility and gentry. It is a place of great resort for strangers, as well as for the inhabitants of London. The royal gardens are laid out in the first style by the late Mr. Brown, and are kept in the highest order, and as they communicate with the royal gardens at Kew, which are also famed for containing the finest collection of plants in the world, they afford the most enchanting walks, at stated periods, to an immense concourse of people.

Carshalton, Mitcham, Merton, and Wandsworth carry on a considerable trade in bleaching, calico printing, &c. through the means of the river Wandle, of which a more particular detail will be given in our account of that river.

At Beddington place, near Croydon, the first orange trees that were brought to England were planted in the open ground, and protected in the winter by glass frames placed over them. They were brought from Italy by Mr. Carew, whose seat it then was, and they flourished for above 100 years. I cannot learn what became of them, as the estate has since passed through many hands.

Southwark is a very populous borough, and an adjunct of the city of London, as a ward under the name of the Bridge-ward Without. It contains not only a vast number of manufactories, but is the depot for hops, leather, wool, brooms, charcoal, and fuller's earth. Most of the coasting shipping load and unload on the wharfs; and it has besides a very extensive trade with the Eastern, Southern, and Western counties.

#### RIVERS.

This county has five rivers of inferior magnitude to the Thames, which, after traversing it in various directions, and rendering the most essential services to its agriculture, its manufactures and commerce, empty themselves therein, with the exception of the Medway, which discharges itself at the Nore.

These rivers are the Wandle, the Mole, the Wey, the Lodden, and the Medway.

#### THE RIVER WANDLE.

The Wandle takes its rise above Croydon, and receiving several tributary streams in its passage through Waddon and Beddington forms a large reservoir at Carshalton, where it is powerfully assisted by some strong springs which issue from

the pretty park of George Taylor, Esq. as well as from the grounds of David Mitchell, Esq.; being thus augmented, it winds through Wallington with a quickened motion, and passes through Mitcham, Merton, Tooting, and Wandsworth, where it enters the Thames. During its progress, its various ramifications and windings supply works to an incredible extent; and, for its length and size, perhaps no river in the world does at this time furnish so many valuable and various manufactories, of which the following are some of the most considerable.

In passing through Croydon, the first works which it supplies are the calico and printing grounds of Messrs. Lane and Lay at the college, and their bleaching grounds on the outside of the town, near the barracks; 2dly, It supplies the bleaching grounds belonging to Mr. Parker, in the same parish; 3dly, It turns the flour mills belonging to Mr. Wattney at Waddon; 4thly, Mr. Williamson's snuff mills at Beddington; 5thly, The very extensive printing and calico grounds belonging to that very ingenious artist, Mr. W. Kilburn, at Wallington, and receiving a very considerable augmentation out of the park and grounds of George Taylor, Esq. and David Mitchell, Esq. at Carshalton; 6thly, it supplies Mr. Curtis's paper mill; 7thly, Messrs. Charrington and Gray's flour mill; 8thly, Mrs. Ansell's snuff mills; 9thly, Messrs. Bailey and Ansell's calico works; 10thly, The large oil and skin works belonging to George Shipley, Esq. and Son; 11th, The very extensive (and probably the largest in England) bleaching grounds; and also 12th, The flour mills belonging

to Messrs. Jacob and George Forster Reynolds; 13th, the skinning mills in the possession of Messrs. Pillet and Paul Savignac; (Messrs. Chisham and Stephenson also make use of the river in their occupation, as whitsters, at Mitcham Common corner;) 14th, It serves the calico and printing grounds belonging to Mr. Kinlay; 15th, Mr. Sutherland's calico and printing grounds; 16th, Mr. Foster's logwood, and 17th, his flour mills; 18th, Mr. Glover's flour mill, and 19th, Mr. Stevenson's snuff mills, all in Mitcham parish; 20th, It supplies Mr. Fenning's calico and printing grounds; 21st, Messrs. Polhills two snuff mills at Morden; 22d, Mr. Newton's calico and printing grounds, Merton; and 23d, Mr. West's at Merton Abbey; 24th, The extensive copper works in Merton town, crosses the turnpike road to Epsom; and 25th, Turns those very spacious flour mills belonging to Mr. Perry of Merton. These mills work seven pair of stones, and the whole interior of the works, machinery, &c. are said to be the most complete of their kind in England; and in order that a constant supply of water may be had at all seasons to assist the river in carrying on such an extensive concern, the proprietor has dug out the soil from an adjoining field and formed it into a large basin of some acres in extent, which, being full of springs, contributes greatly to the supply. This gentleman grinds for hire only, according to my information. 26th, It serves the calico and printing grounds of Mr. Coleman, in Wimbledon parish; 27th, Turns the very extensive oil mills belonging to Messrs. Were and Bush, in Garrat-lane; 28th, Then supplies the calico and printing grounds of Mr.



Howard; and 29th, Those also that were some time since occupied by Mr. Gedge; 30th, Together with those large iron works in the possession of Mr. Henkell, also in Garrat-lane; 31st, Next it serves the dying grounds of Mr. Williamson; 32d, The calico and printing grounds belonging to Mr. Gardiner; 33d, The capital oil mills in the occupation of Messrs. Shipley and Poppineau; and also 34th, their flour mill. It then takes its course under the high turnpike road to Portsmouth; 35th, Passes along the dying works of Messrs. Berchard and Platts; 36th, Supplies the porter brewery adjoining; 37th, Turns another flour mill belonging to Mr. Shipley, and finishes its course into the Thames at Wandsworth; after turning 38th, The very large and capital flour mill belonging to Mr. Bush, jun.

It is computed that this river, small as it is, certainly when compared with other rivers, and during the short distance of about ten miles, furnishes employment for upwards of 1700 people; and when the whole of these manufactories are in full work, the number will be little, if at all short of 3000; and the capital employed to be fluctuating between half a million and one million sterling.

#### THE RIVER MOLE.

The Mole rises in various places, but by uniting its streams, it forms two rivers of vast importance to the agriculture and manufactures of the county. One of these branches has its source in the parish of Merstham, turns one flour mill at Ham in the parish of Nutfield, one in Bonnar's-lane leading from Rei-

gate to Horley; then crosses the road, and receiving another stream that comes from Tilgate Forest, turns Sidley flour mill, at which it becomes a large stream, takes a course across the turnpike road from London to Brighton, turns Sedcant mill near Leith; and uniting with a stream that comes from Capel, takes a course through Beatchworth, and turns a flour mill belonging to Mr. Dewdney. It then enters Dorking parish, where it winds round three sides of Mr. Peters's house, turning an engine for the supply of it and the offices, and a flour mill just without the park, in the occupation of Mr. James Dewdney; it takes a course from thence through Burford Lodge in Mitcham parish, to Slyford, where it turns another flour mill, and then enters the Swallows at Boxhill. Another branch rises at Magswell, about 4½ miles from Dorking, the source of which is about 6 ft. by 9, and in the course of the distance I have stated, it turns first, the Rookery flour mill belonging to Richard Fuller, Esq. secondly, Wescot flour mill, occupied by Mr. James Bravery; thirdly, Milton Court flour mill belonging to Sir Frederick Evelyn, occupied by Mr. Wells; fourthly, Mr. Graver's flour mills; fifthly, Mr. Abel's flour mill, sixthly, Mr. Saunderson's flour mill, turns a large engine to supply the town of Dorking with water, and afterwards enters the Swallows.

These streams are supposed to unite in their progress under ground, and break out at some distance, skirt Norbury Park, and form a large stream in passing through the grounds of Henry Bolton, Esq. of Leatherhead; it then continues winding by Fetcham, turning Slyfort mill, to Stoke Dabernon, turns to the left through the grounds of Lord Carhampton,

skirting those of Henry Page, Esq. at Pointers, where its fertilizing stream enriches some beautiful meadows; it continues its course through the long famed grounds of Painshill at Cobham, the property of William Moffatt, Esq. member for Winchester, turns the iron mills belonging to Messrs. Rabey, and proceeds through the grounds of Miss Pelham, at Esher; turns the flattening mills at Ember Court, and empties itself into the Thames at Molesey, opposite Hampton Court. Another branch takes its source under Leeth Hills, passing through Wootton, turns two flour mills belonging to Sir Frederick Evelyn, occupied by Mr. Wells, winds through Abinger (where there was formerly an iron foundery, the works of which it turned, but are now entirely demolished) to Shire, where it works two flour mills belonging to ——— Lomax, Esq. passes through Albury, turning five flour, paper, and powder mills, to Shalford Bridge, when it enters the Godalming river, near Guildford. In numbering up these mills and engines, we find that this important river turns no less than 24 mills of the first consequence to their respective neighbourhoods. The tract of country through which it passes is perhaps among the most healthy and delightful spots in the universe; and although in point of fertilization the formation of the greater part of the land render it but of little value for irrigation, yet, as a picturesque object, it enlivens and beautifies more noblemen's and gentlemen's seats than many of the largest navigable rivers in the kingdom.

#### THE RIVER WEY.

The Wey rises in Holt Forest, enters the county at Frensham, meets another stream that rises about

Brinstead in Hampshire, which enters the county at Farnham, passing by Waverley Abbey, receives another stream from Thursley (after supplying Mr. Nalder's crape-mills on Hammer-pond Heath) and Elstead, passes by Pepper Harrow, and thence continues to Godalming, where it supplies the canal from thence to Guildford. The waters of this canal, uniting with those of the Mole, form a navigable river, at Guildford to the Thames at Weybridge, but not altogether without the assistance of some lock-works, said to be the first erected in this kingdom, which were constructed many years since, by Sir Richard Weston, of Sutton-place, near Guildford. He is also said to have been the person who introduced the red clover into England, for which every farmer is now under the highest obligation to him, for one of the first improvements in the economy of the farms. The course of the river from Guildford passes through Stoke, Send, and Woking, receiving another stream from Ash through Worplesdon, and joining above Purford Lodge, continues its progress through Byfleet and Weybridge to the Thames, at Ham-haw; but the navigation separates a little below the Lodge. It passes through Wistley to Weybridge; another stream rises at Bishley, proceeds by Cobham and Ottershaw to Weybridge, where they all empty themselves into the Thames; besides the several flour and paper mills which these streams turn, a very considerable trade is carried on by means of the navigation from Godalming and Guildford, in timber, bark, charcoal, hops, hoops, lime, chalk, flour, malt, grain, wool, &c. Its returns are coals, coke, groceries, strong beer, spirits, corn, iron, iron-mongery, glass, pottery, upholstery, and foreign timber, &c.

**THE RIVER LODDEN**

Rises near Farnham, and taking a course nearly north west, passes through Frimley; and from thence in a similar direction to Reading, where it enters the Thames. As this river passes through a part of the country, at present in a very uncultivated state, the only use to which it seems applied at present, is to feed the Basingstoke Canal; but as the parish of Frimley is now enclosing, there is no doubt but every advantage will be taken of it, for irrigation, wherever the land lies low enough.

**THE RIVER MEDWAY**

Rises in the parishes of Godstone and Horne, passes at the bottom of Felbridge Park, after turning a flour mill, crosses the turnpike road from London to Lewes, becomes a large sheet from numberless springs, turns the wire mills belonging to Mr. Fossick, of Crooked-lane, London, and passes through Lingfield parish, where it turns two or three flour mills to Edenbridge in Kent, where we leave it. Another stream rises at Godstone, turns in its progress through Crowhurst one flour mill, and uniting at Pond Farm with another stream from Oxted through Tandridge, joins the main river just before it leaves the parish of Lingfield, at the extremity of that side of the county. This river passes through so small a part of the county, and which is so unevenly formed, that, with the exception of a portion of it about Sir Thomas Turton's at Starborough Castle, little irrigation is effected by it; that stream which proceeds from Oxted is by much the most beneficial

as it brings along with it a large portion of chalk and other calcareous substances, which it deposits, and which the farmers thereabouts, to their great credit, assiduously avail themselves of, for dressing their meadow lands.

## CANALS.

### THE CROYDON CANAL.

This magnificent undertaking was set on foot in the year 1800, by the spirited enterprise of a few gentlemen residing in the neighbourhood of Croydon; who, flattered with the prospect of an abundant supply of water, and with the great increase in the traffic of the town and parts adjacent, were solicitous of availing themselves of these circumstances to open a new communication between that place and the metropolis. They therefore thought it advisable to take the opinion of some engineer of eminence, and accordingly applied to that very able and ingenious artist, Mr. John Rennie, of Stamford-street, London; who, having taken a view of the intended line, and possessed himself with a plan thereof, furnished the committee as speedily as the object in contemplation would permit him, with the necessary particulars to enable them to judge of the practicability of the measure. The committee, or rather the gentlemen then interested, were so well satisfied with Mr. Rennie's report, as to induce them to open a subscription (which was very soon filled) for the purpose of carrying into execution the plan he had laid down. As his report, which is not very long, will be more illustra-

tive of the design than any abbreviated description that I can give, I have taken the liberty of copying it for the information of the board. I have also reduced the plan of the canal to a scale which will admit of its being introduced as a further elucidation of the work.

The original design of the committee, and agreeable to the Plan, was to have had two inclined planes instead of locks, and to supply the canal with water by pumping it from the Thames by means of a steam engine; but, during the progress of the work it was thought more advisable to resort to locks instead of the inclined planes, and they are since being put into execution. The resident surveyor, Mr. Clark, is of opinion that the great body of water which is contained in the canal from the basin at Croydon to the first lock at B near Forest Wood, being a distance of upwards of seven miles upon one level, is of itself so considerable, that, with the addition of a large reservoir upon Sydenham, and another upon Norwood Common, it leaves no doubt of a most ample supply in the driest season. This belief is considerably strengthened by the nature and the quality of the soil through which the canal passes, which besides being very tenacious, is also a most excellent brick earth, and fully justifies the declaration of the contractor, that few canals in any part of the kingdom can boast of such a soil for so great a length of line.

The canal is in such a state of forwardness as to be navigable from that end of Forest Wood nearest Deptford, through Sydenham and Penge Commons,

and is rapidly approaching its destination at the town of Croydon.

By Mr. Rennie's estimate £64,100 was to complete the work with locks to the Thames, but the great advance in the price of labour in consequence of the war will nearly, if not quite, absorb the savings which would have arisen by this canal stopping short of the Thames; and the committee will in consequence have a fresh subscription to raise in order to make good this deficiency. The place where the Croydon Canal stops short is where it forms the junction with the Grand Surrey Canal, after crossing the Deptford road, near the middle distance between New Cross turnpike and the lane leading to Peckham and Camberwell.

As the Croydon has no other connection with the Grand Surrey Canal than their junction, I have endeavoured to obtain as much information as possible with regard to the state, the process, the ultimate views of the subscribers, and the expence of the latter to the Thames, in order that the whole line may be seen at one view. And this will properly follow the concluding particulars of the Croydon Canal.

To Thomas Walker, Esq. of Bird's Lodge, Croydon, the very worthy treasurer to the undertaking, I am indebted for these particulars as well as for the original plan of the whole line.



**Copy of Mr. RENNIE's Report.**

*To the Chairman of the Committee of the proposed  
Canal from Croydon to Rotherhithe.*

SIR,

I have viewed the country between Croydon and Rotherhithe down the vale of the Bourne, in the line pointed out to me, and had much reason to be satisfied with its general appearance; there being no obstacle worth mentioning to prevent the execution of a canal.

The line which has been surveyed by Mr. Warner, commences in a field adjoining the turnpike road, at the north end of Croydon, and crossing the common in a north-easterly direction, passes to the east of the Goat House, on Norwood Common, and from thence along Penge Common, and through Sydenham and Forest Wood to a field in the occupation of Edward Owen; being a distance of near seven miles on one level. At this point the ground begins to fall, and an opportunity is afforded of descending by locks, or by two inclined planes, as shall be judged advisable. Mr. Warner has surveyed both, and they are laid down on the plan that accompanies this report. The line for locks passes to the west of the telegraph, and crosses the Deptford road in New Cross. That for inclined planes continues a little further on the same level, to a field in the occupation of William Edmonds, and keeps to the east of the telegraph, and through a part of Deptford common, winding round the Hill-fair, and crossing the Deptford road little more than a furlong east of the other, and soon afterwards joins it; from thence it passes

through the marshes to the west of Greenland dock, and joins the river Thames at Leonard and Co's wharf, in Rotherhithe, being from near New Cross to the Thames on one level the whole fall, amounting to 149 feet seven inches to the top of an ordinary tide, lies between the field in the occupation of William Edmonds, and the north side of New Cross.

On the 25th of June last, I carefully examined the sources from whence a supply of water was to be expected, but I could find nothing, except that of the Wandle, capable of affording any thing like a supply; for as to the few insignificant springs which supply a part of the Deptford brook, they are scarcely worth mentioning; and the country is of too open and porous a nature to afford an opportunity of constructing reservoirs for the reception of flood water, which is here very inconsiderable; and as the Wandle supplies such a number of valuable mills, I apprehend they are unable to spare any of their water. As to the idea which has been suggested to me of drawing a supply from Croydon common by digging the canal to 13 or 14 feet deep, I think no dependance should be placed on it; nor should any thing be done which in the smallest degree can injure either the mills on the Wandle, or those on the Deptford Bourne. If therefore a canal is to be made in this line of country, other sources must be found for supplying it with water, without injuring the mills in question; and for this purpose none seems so eligible, except pumping it from the river Thames by the power of steam.

The principal trade, I apprehend, that is likely to pass on this canal, will be coals, fire-stone, flints, fullers-earth, grain, flour, timber, and faggots, &c. The quantity of bulky goods, timber and faggots excepted, will be inconsiderable; and as this canal is not very likely to be extended beyond Croydon, I apprehend a canal of small dimensions will be sufficient. If a canal with locks is adopted, the boats may be 75 feet long, and about seven feet wide, capable of carrying 25 tons. If with inclined planes, the boats should only be capable of carrying a load from five to seven tons. But as the difference in breadth for the 25 and the five ton boats is very inconsiderable, and as the former will be navigated singly, while the latter will be in gangs, (which requires more room than single boats,) I think the canal should be nearly of the same dimensions for both sizes of boats. This I propose to be for the summit level 14 feet bottom, 34 feet top, and six feet deep; as I propose it to answer in part as a reservoir, in case the pumps should at any time be out of repair. The bottom level, from the Thames to New Cross, I also propose to be large.

If the lock canal is adopted, I do not apprehend there will ever be more than five boats pass up and five down daily on the average. This therefore will require ten lockfuls of water, besides the waste. A steam engine capable of supplying both, will cost, with necessary tunnels, shafts, and pumps, about £10,000, and the annual expence of fuel, attendance, tear and wear, will be about £1,350. The money therefore required to be ex-

pended in the first execution of the works, will be £64,100. The annual expence of fuel, &c. to the engine of course comes out of the annual profits.

The expence of making the canal with inclined planes, including the steam engines and machinery, and with one lock at its junction with the Thames, will amount to £46,516. I propose two planes, as the ground is not suitable for one; each plane will require a small steam engine to wind up the boats, when there is not weight sufficient descending from the summit level; and when they are not employed in this way, I propose them to be employed in pumping water to supply the waste in the summit level. Not knowing the proportion of descending trade, compared with the ascending trade, I have calculated on the engines taking up annually thirty-two thousand tons; on this supposition the expence of supplying the canal with water, the taking up the boats, the attendance, the tear and wear in the engines, planes, machinery, and ropes, will amount to £1,550 per annum, this is £200 more than the former; the reason is, that being two engines, the expence of attendance will be double, and the tear and wear of the ropes, and machinery of the plane is very considerable; but as the tear and wear of locks, gates, &c. in the other line has not been estimated, I apprehend if this is added, it will render the annual expence of the locks, engine, &c. nearly as great as this.

A canal with locks and boats capable of carrying 25 tons burthen, is certainly more suitable to the general trade of a country, than that with inclined planes; but as there is a difference in the expence, as per estimates, of £17,584, even on the

supposition that both canals are of the same dimension, and as the canal for inclined planes will admit of a diminution, that will save at least £3,000, there may be fairly reckoned a saving of £20,000 in favour of the canal with inclined planes. I am not sufficiently acquainted with the trade of this district to say, what disadvantage will arise from the adoption of the small canal, but I apprehend it cannot be so great as the saving in question; for were even the faggots entirely excluded, and the timber, which is of an extraordinary size, the tolls arising from these articles cannot amount to one half the saving; but I apprehend very little even of these articles will be sent otherwise than by the canal, for as the boats will carry the greatest part of the timber, and as there will always be considerable quantities of fire-stone, flints, fullers-earth to be brought down, the boats may be partly loaded with those articles, and partly with bark or faggots.

If, therefore, from the expence which I have stated, it appears eligible to have a canal at all, I apprehend it will be determined in favour of one with inclined planes, or some other such substitute for locks.

I am, Sir,

Your most obedient servant,

JOHN RENNIE.

Stamford-street, London,  
8th October, 1800.

*Estimate of the Expence of making a Canal from  
Croydon to the River Thames, at Rotherhithe.*

Summit level to be 34 feet wide at top, 14 feet at bottom, and 6 feet deep.

Rotherhithe level to be 44 feet wide at top, 24 feet at bottom, and 6 feet deep.

|                                                                                                   | £       | s. | d. |
|---------------------------------------------------------------------------------------------------|---------|----|----|
| 1 To cutting from the proposed basin near Croydon, to the valley near Selhurst wood.....          | 2,380   | 16 | 0  |
| 2 Embanking and puddling said valley .....                                                        | 712     | 2  | 0  |
| 3 Cutting from said valley to the division between Norwood and Penge common, with a culvert       | 639     | 0  | 0  |
| 4 Embanking a valley near the division between Norwood and Penge common .....                     | 82      | 3  | 0  |
| 5 Cutting to and through a hill on Penge common                                                   | 516     | 18 | 6  |
| 6 Embanking and cutting from the above hill to the valley, by the Beckenham road .....            | 217     | 7  | 0  |
| 7 Embanking ditto valley, with a culvert. ....                                                    | 190     | 0  | 0  |
| 8 Cutting to the valley south of Sydenham ....                                                    | 287     | 18 | 6  |
| 9 Embanking said valley .....                                                                     | 116     | 15 | 6  |
| 10 Cutting through a hill in Sydenham-street. ....                                                | 815     | 6  | 0  |
| 11 Embanking a valley with a culvert, at ditto ..                                                 | 117     | 3  | 0  |
| 12 Cutting through a hill, by ditto .....                                                         | 221     | 7  | 6  |
| 13 Embanking a valley on Sydenham common ..                                                       | 112     | 16 | 0  |
| 14 Cutting through a hill on the common .....                                                     | 365     | 11 | 0  |
| 15 Making the canal from the said hill to the first lock at the end of summit level .....         | 1,233   | 10 | 0  |
| 16 Ditto, from summit level to the lower level at New Cross .....                                 | 1,450   | 0  | 0  |
| 17 Cutting and puddling from thence, to the Thames at Rotherhithe .....                           | 2,370   | 0  | 0  |
| 18 Leveling, soiling, and trimming the banks, making the towing-path, fencing, quicking, &c. .... | 3,472   | 0  | 0  |
| 19 Two 24 feet road bridges, five 15 feet ditto, and 30 accommodation bridges .....               | 7,130   | 0  | 0  |
| 20 Eighteen locks, including that at the river Thames at Rotherhithe .....                        | 16,800  | 0  | 0  |
| 21 Puddling and pounding ditto .....                                                              | 250     | 0  | 0  |
| 22 Land and temporary damages .....                                                               | 8,200   | 0  | 0  |
| 23 Wharfs .....                                                                                   | 1,500   | 0  | 0  |
| 24 Steam engine, with necessary tunnels, shaft, &c.                                               | 10,000  | 0  | 0  |
| 25 Supervisial, utensils, and unforeseen expences                                                 | 4,919   | 6  | 0  |
|                                                                                                   | £64,100 | 0  | 0  |

*Estimate of the Expence of making a Canal from Croydon to the River Thames, at Rotherhithe.*

Boats to be conveyed from one level to another by inclined planes.

|                                                                                                                                                               | £              | s.       | d.       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------|----------|
| 1 To the first 14 articles of estimate, N <sup>o</sup> 1.....                                                                                                 | 6,775          | 4        | 0        |
| 2 Making the canal to the head of the first inclined plane.....                                                                                               | 1,391          | 18       | 0        |
| 3 Forming the earth to receive the inclined planes                                                                                                            | 900            | 0        | 0        |
| 4 Making the canal from the lower end of the inclined plane, to the Thames at Rotherhithe..                                                                   | 3,290          | 0        | 0        |
| 5 Leveling and soiling the banks, making the towing-path, and fencing ditto.....                                                                              | 3,270          | 0        | 0        |
| 6 Two principal road bridges, 15 lesser ditto, and 30 accommodation ditto.....                                                                                | 6,460          | 0        | 0        |
| 7 Two inclined planes, with their requisite machinery .....                                                                                                   | 4,500          | 0        | 0        |
| 8 Purchase of land, and temporary damages ....                                                                                                                | 8,200          | 0        | 0        |
| 9 Wharfs.....                                                                                                                                                 | 1,500          | 0        | 0        |
| 10 Two steam engines, for hauling the boats up the planes, and for supplying the canal with water, when not working the planes, with shafts and tunnels ..... | 6,000          | 0        | 0        |
| 11 Supervisial, utensils, and unforeseen expences                                                                                                             | 4,228          | 0        | 0        |
|                                                                                                                                                               | <u>£46,516</u> | <u>0</u> | <u>0</u> |

## THE GRAND SURREY IRON RAILWAY.

Among the multitude of improvements for facilitating the commercial intercourse between the different parts of the kingdom, and more particularly between the various parts of the same county, perhaps this very conspicuous undertaking bids fair to rival the long and wide spread fame, and universally approved system of canals.

Railways have been long in use in the iron, the coal, the pottery, and other extensive works in the

north of England, but the system has been always, and altogether, as far as I have been able to learn, confined to the works of each individual manufactory, nothing like the present having been undertaken either by any private individual, or by any public body as a medium of conveyance between the one part of a county and another, or from thence to any particular sea-port.

This vast and important concern was undertaken by the public spirit and enterprise of a few individuals in the county, in the year 1802 and 1803, who, having previously employed an able engineer to ascertain the practicability of the scheme, were so well satisfied with the plan and the report accompanying it, as to induce them to apply to Parliament for an act to enable them to carry into execution the plan that was laid down by the said engineer. The act having passed, a subscription which had previously been set on foot was now completed, and the sum of £50,000 raised, to be paid by instalments, in transferable shares of £100 each.

The ground through which the railway was to pass in its progress to Carshalton and to Croydon was now to be staked out, and the fee simple thereof to be purchased, which being effected, a grand basin was begun near the river Thames, at Wandsworth, adjoining to the junction of the Wandle with the Thames. This basin is sufficiently capacious to contain 30 or more craft of various sizes, from the west country barge to the small lighter and passage boat: along the east side of this basin the waggons and carts load and unload their respective cargoes; and from this basin



Messrs. Shipleys have a railway to an extensive range of newly erected warehouses, close and alongside a branch of the Wandle, where lighters load and unload. Warehouses, and other offices are, I understand, intended to be erected to receive the several goods in transitu, and to collect the tolls, &c. payable for passing the railway.

From this basin the railway proceeds across the high turnpike road from London to Portsmouth, close by the Ram Inn, a short distance down Gar-rat-lane, turns to the right over the Wandle upon a wooden bridge, follows the river close by Messrs. Shipley and Poppineau's flour and oil mills, by Mr. Williamson's dye houses, recrosses the Wandle to the left upon another wooden bridge into Gar-rat-lane, close to the iron works belonging to Mr. Henkell; it then enters some fields, keeping as close as possible to the lane until it comes to Messrs. Were and Bash's oil mills, to whose works a railway is laid. It then pursues as regular a track as possible so as to avoid all unnecessary expences, without losing sight of the manufactories, and crosses the Epsom turnpike road, above the turnpike house at Merton, taking a southerly direction until it crosses the Sutton turnpike road at Mitcham, at a short distance from Mr. Glover's flour mills; it then takes a south-east direction through the fields, and at the back of Alderman Smith's house, until it enters Mitcham common by Mr. Sutherland's gate. One branch keeps at a short distance from the houses on this side of the common, and by maintaining nearly a straight line, joins the London road to Carshalton on the south side of Mitcham common, keeping along the road side until it passes

Messrs. Reynolds's lodges; it then takes off a corner of a field (which has supplied them with an abundance of good gravel) belonging to those gentlemen in its winding course to Messrs. Shipley's oil and skin mills, at Carshalton.

Resuming the main line from Sutherland's gate, it takes a diagonal direction across Mitcham common, at a short distance from, but at the back of the barracks, until it enters Messrs. Lane and Lay's calico and printing grounds, at the college in Croydon, and proceeds through the same and some other fields in a curvilinear direction until it meets Mr. Hammond's park, when it takes off a corner of it, and passes in the front of the turnpike house at Croydon.

Thus far it is nearly complete with a double railway; that is, the one being used for the passage outwards, and the other for the return, without obstructing each other, as would be the case if there was only one road; they have, nevertheless, at certain distances a method of letting the waggons pass from the one road to the other by a short diagonal railway, and by throwing or forcing aside a bar of iron moving on a pivot, which enables them to move in and out with the greatest facility.

This is the extent of the first act of Parliament, and the first subscription. The distance is as near as possible ten miles.

The completion of this line was estimated at £2000 per mile, but the money already expended and required for finishing it, including all expenses of surveys, act of Parliament, making the basin, waggons, tumbrils, toll gates, clerks fees, &c. will nearly amount in the aggregate, to the sum

of £50,000; at least such is the received opinion; for this fact, and some queries, which I left at Mr. Lattley's house, (the clerk to the company,) which I requested might be answered, were considered so perfectly confidential, that he could not consistently answer them. The best informed people along the railway seem well convinced that it never can answer, or in other words, that it never will pay the subscribers 2½ per cent. Time alone will prove its advantages or disadvantages.\*

CONTINUATION OF THE GRAND SURREY IRON  
RAILWAY.

The great success which had attended the execution of the first line of railway having given a degree of eclat to the undertaking, which the most sanguine expectation could scarcely have expected; a spirit arose in a new set of adventurers which I think could never in the first instance have been in contemplation, namely, among the landed proprietors; and it having been found practicable after an accurate survey, to continue the railway from Groydon to Reigate through Merstham, with a branch from the latter place to Bletchingley and Godstone, a fresh subscription was entered into, and an act of Parliament obtained in the sessions of 1803 and 4 for carrying the design of the subscribers into execution. The sum subscribed was £ by

\* Since writing the above, the company have been obliged to go to Parliament for leave to raise more money, and an act has passed for that purpose; instead therefore of the expence being £2000 per mile, it appears as if it would be £7000, and this was that confidential matter which could not be revealed. I am of opinion it might have been done for a much less sum.\*

transferable shares of £100, and the money so subscribed, to be paid by instalments as usual. As soon as the act was passed, and a certain sum or portion of the subscription was paid into the hands of the treasurer, the line was marked out, the ground immediately wanted was purchased, and the work as quickly begun, and it has proceeded so rapidly, that one of the roads of the railway is expected to be completed early in the ensuing spring, but they have difficulties to surmount in this line which they had not in the former; namely, that of filling up valleys between hills, and increasing the height of hills, which of themselves were not sufficiently elevated to preserve that regular rise upon the inclined plane which can alone carry them to the place of their destination. Some of these valleys amount to ten feet, others to above twenty feet perpendicular height, by at least thirty feet in width, they have also to sink a road on the approach to Merstham, of thirty feet perpendicular in some parts; and these raisings and sinkings occupy a great part of the latter portion of the road, and cannot fail of being attended with a very heavy expence, although it is possible that even this may be abated by the quantity of flints that may be produced, as well as chalk, with which this ridge of hills abounds. There are also some large arches to be thrown across the highway road, as a communication underneath from the downs to the said road, &c. all which cannot fail of swallowing up very large sums, even under the most favourable circumstances, and more considerable than the first railway did, though there may be a great saving in the difference of the value of the land to be purchased in favour of this line of railway.

From the junction of the railway at Croydon turnpike, the line proceeds close along the turnpike road on the west side until it passes Mr. Barratti's grounds and fields, it then recedes from the road, and winds the hill in the open fields, still keeping the road in view, and within about 150 yards of it, until the road quits Croydon parish for the lower road to Godstone; the railway however proceeds in its regular elevation or rise, every here and there cutting away the side of the hill on the north-side of the railway, and filling up valleys until it arrives at the Red Lion at Smitham-Bottom, where on passing it, is a valley of some considerable width, which they have raised above twenty feet perpendicular, and in the direction of the railway an arch is built with brick of sufficient height and width to admit a waggon loaded with hay, straw, faggots, or the like, to pass underneath from the downs to Smitham-Bottom.

The railway continues to wind the hill, and to approach the Merstham road from Croydon until it passes by Colonel Byron's, and for some considerable distance beyond it, then crosses the road over an arch of about the same capacity as the preceding, but in order to make it quite so they are obliged to sink the old highway road of a sufficient depth for that purpose; they are compelled to adopt this method, (though it may ultimately prove disadvantageous to the highway road) because if they had carried the arch high enough to admit of the highest load of hay, straw, faggots, furze, hops, &c. that may at any time have occasion to pass under it, it would have thrown the crown of the arch too high, and consequently the plane of the railway too much above the regular elevation or rise which

they are obliged very carefully to attend to, as will be hereafter made manifest and evident. After crossing the road the railway takes its course parallel with the road on the south or left hand side of it, and finding the ground to be too high for their plan, they now begin to sink it, and so continue to do with such an increase of depth as will make a cavity or hollow road way of thirty or more feet perpendicular for a considerable distance in its approach towards Mertsam. But as this latter part is only beginning I am unwilling to enter into more minute particulars, because I confess I am indebted for this information to the principal workmen, those especially whose department it is to lay the iron railway, and who, of course, I judge must know, because they cannot lay one bar without making use of the spirit level, for fear of rising too rapidly or not sufficiently so.

The rise of the inclined plane is one inch to every four bars or ten feet; the width of the two roads, that is the exit and the return road, together with the foot ways cover a space of 24 feet.

I am informed that one horse will draw down the plane 90 quarters of wheat, but it is usual to secure three waggons together, and these to be drawn by two horses, which they tell me will draw 75 quarters; whether this be true or not, as I have not seen it done, I cannot say. I confess it appears incredible. Some of the waggons are made to shoot their loads, the front wheels are then placed quite forward, and the other two exactly under the center of the body of the carriage, each wheel is two feet high, and the length of the waggon about 6 feet.

The support for this railway is expected to arise from lime, flints, fuller's earth, fire, and other stone,

with which the country about Merstham, Reigate, Nutfield, Blechingley, and Godstone abound, together with no inconsiderable quantity of corn and flour which will be carried to London, and from thence various sorts of merchandize, dung, and other manures, &c. &c. will be brought to the different shopkeepers and farmers.

The following ideas from the pen of that very able engineer, Mr. R. Fulton, on the subject of iron railways, are so much in unison with my own, that I feel it my duty to lay them before the public in his own words.

A cast iron rail roads, says he, have hitherto been constructed as a medium between lock-canals and cartage; in consequence of the expence of extending the canal to the particular works in its neighbourhood.

But as the small boats so materially reduce the expence of canals, that is, when the inclined plane is adopted, they come nearer to the expence of rail-roads with which they must now be compared. The usual estimate of rail-roads is about £1,600 per mile, which are single with passing places, and only calculated for a descending trade; the whole being formed of a gradual descent from the works to the canal; generally so calculated that a horse may return the empty waggon with the same ease the full ones descend; on these the average work is about five tons to a horse, descending at the rate of three miles per hour, or one ton ascending at near the same speed; on which the wear of waggons is very considerable; which wear must generally fall on the company; while the loading into waggons, then unloading at the canal where there is usually a deposit for want of boats, and again loading into

heath, tends to increase the expence of conveyance, and injure the various articles.

There can no idea be formed of the expence of a canal compared with a rail-road without being acquainted with the circumstances, but these should be well considered before a railway is laid down; and the canal should considerably surpass the expence of the rail-road, *particularly if the length is greater than two miles*, in order to induce subscribers to relinquish it for a railway; and my reasons are, that when a railway is laid down, it excludes in a great measure, the return trade, and shuts out the prospect of extension; the county beyond its extremity has no more hope of assistance than before its construction; nor will any company unite with it, for if it is added to the difficulties increase as passing places are inadequate to an important trade, consequently it would be necessary to form them double, increasing the expence and the repairs, without the power of raising succours to the high and interior country.

Yet the small canal is sufficiently wide to pass at every part, and transfer a trade with equal ease; meandering the hills, it holds out assistance to the sun-burnt fields, and seems to invite connection. In a country through which a railway or canal is constructed, there are some hopes of progressive improvement and future extension; which ultimately brings the inquiry to two questions: Whether do canals or railways present the best prospect of extension? And which will most facilitate conveyance by a union of branches?

It is therefore prudent to consider well the various circumstances, before a railway of even one mile in length, is laid down.



Railways of one mile, or thereabouts, will no doubt be frequently necessary, where it may be difficult to find water at the extremity; or when the trade from the works is not sufficient to pay the expence of machinery, and its extent being but one mile, can be of little importance to the country.

It is not at all improbable but this latter Railway Company may form a junction with the Croydon Canal Company, and by this union obtain a much greater portion of trade than could reasonably be expected from the Wandsworth railway; indeed, such a thing is now talked of, and if it does take place I most heartily wish them success.

#### CLIMATE.

The temperature of this county is very much affected by its local and relative situation. For a distance of five miles from London-bridge the air is in a certain degree softened by its proximity to the metropolis; from thence to the 10 or 12th mile stone the air is colder, but still mild; beyond that distance, whether it is through Croydon, Sutton, or Ewell, the air becomes more keen and piercing, until you pass Godstone, Reigate, and Dorking, when it becomes somewhat softer, but also rather humid.

Beyond Kingston, until you reach Guildford, and on the north west side of the road, the country is more flat, the air is mild, somewhat moist, but not wet; on the south east side, the land is more elevated for about six or seven miles across, and the air is keener and dry. From Godalming to Haslemere, to the left, it partakes of humidity; to the right as far as Farnham it is dry, but rather cold; and thus continues more or less so to Bagshot, with the ex-

ception of the country about Warpleston and Bishley, which is more flat, strong, humid, and cold; the reason of this diversity will naturally enough appear when we come to speak of the soil and its situation. Upon the whole, however, the climate of Surrey may with great propriety be said to be congenial to the health and longevity of man, and to the growth of vegetation, of which many remarkable instances might be given. It possesses a superior advantage to Middlesex by the long continuance of the south west winds, which blow the smoke of London to the north and north east, and consequently from this county; and hence it is that so many physicians, when their patients require to be moved into the country for air, send them almost uniformly into Surrey.

I have been particularly anxious to procure a correct diary of the weather in each of these districts for the last three or four years, but could only find one, and that was in the clayey district. I thought it therefore not worth taking notice of; but could the whole have been procured, it would have been a valuable piece of information.

#### THE SOIL AND SITUATION.

Making a station of the obelisk in St. George's fields, and leaving out the turnpike road to Guildford for the present, and striking the segment of a circle from thence of four miles diameter, with a gradual ascent for the same distance, the soil will be found a kindly loam upon a bed of gravel: here too I find the soft or temperate air. Proceeding onwards, and drawing another segment of about eight miles further in diameter, and still gradually

ascending, I shall include a district of strong loams, but principally heavy clays at some depth, upon a gravel of flints; here the air is colder, and the frost takes deep hold of the ground. Beyond this distance, and for near 18 miles, we come to a loam, some parts light and others strong, shallow upon chalk or lime-stone; this is the hilly district, properly the Surrey downs, so famed formerly for its high-flavoured mutton, and is also the keen and piercing part of the county. Passing this distance, and over the last hill at Tilburster, Reigate, and Dorking, we descend into a gently inclining shelving country, to the extent of the county, consisting of a middling loam, strong loam upon a sandy grit-stone rock, clay upon a blue marle, clay mixed with a red sand-stone, a yellow clay mixed with an iron stone. Being much covered with timber, the air is softer than in the last division, but it is also humid.

In the valley formed between the Surrey downs and the hills at Tilburster, Leith, &c. stretching across about one mile, is a vein of sand, some yellow, some red, and some white. Coming now to the Guildford road, we may say that the whole of it from Battersea-fields to Guildford, on the northern side of the road to the river Thames, is either a light loam upon a sand bed, a loamy sand, an almost entire sand, or a sand mixed with decayed vegetables; but as you approach Guildford, the soil is a very deep sandy loam; the climate, therefore, as you approach the Thames, is mild and moist, but not wet. From Godalming to Haslemere, we have the same soil as beyond Godstone and Dorking; various sorts of loams and clays, consequently cold

and humid. To the right as far as Bagshot, leaving out Farnham, the soil is sand of various sorts, the elevation considerable, and consequently bleak and frigid; close under the Hog's Back, to the north, the soil runs from a loam upon a chalk to a strong loam upon a bed of marle, for about four miles across. It is to be understood that in each of these divisions of the county, the soil varies from a sand to a clay, from a chalk to a sand, and to a clay; but such as I have described appears to be very much the character of each division of the county. From this complexion, both of the air, soil, and situation, its various diversified formation into hill and dale, it will not be surprising that it should so abound with beautiful seats; no county can boast of so many. Some of the spots exhibit the most beautiful, some the most extensive, and others the most picturesque scenery, such as the chaste eye of even a Gilpin, or the more eccentric one of a Price, could not but admire. Who has seen the view from the Star and Garter, on Richmond Hill, without bestowing on it an expression of rapture? The terrace in Richmond Gardens, Box Hill, and Headly and Leith Hills near Dorking, Bansted Downs, Hind Hill, and Gratewood Hill near Godalming, Tilburster Hill near Godstone, are among the number that deserve commemoration; from the latter, on a clear day, an expanse of country to the east, south, and west opens to a prodigious extent; indeed at Mr. Poole's house, which is more than half way down the hill, taking the perpendicular elevation, you may see Hailsham church in the Pevensey level, and the windmill at that fatal place, to many an incautious navigator,

Berling Gap, or Beachy Head, near East Bourne in Sussex, a distance in a direct line of 40 miles. Indeed, the vale of Evesham, and the station at Bow Brick Hill, in Bucks, excepted, I hardly know so extensive a view. With the foreground so beautifully timbered, a number of spires and towers diffusively springing up, the hills broke with numberless windmills retiring from the view, while many a gentleman's house diversifies the middle ground, a wild heath, with a few dark clumps forming a back ground, until it is lost between the South Downs and the horizon.

#### MINERALS, METALS, EARTHS, ROCKS, &c.

The mineral springs of this county were formerly held by medical men in the highest estimation, and would perhaps have continued so to this day, but for that extraordinary propensity to fashion and novelty which is so characteristic of the English. This is the reason given by the proprietors of those waters, or by the inhabitants of the neighbourhood in which they are found: but I think a much more rational one may be assigned, which is, that the science of chemistry has within the last twenty years made so great a part of the education of the physician, the surgeon, the apothecary, the philosopher, and the man of taste, and the pursuit has become so much a matter of fashion, that it will not be surprising if very considerable improvements and developements have been made in every branch of it; insomuch that an adept can with tolerable certainty and accuracy prepare a water that shall be perfectly similar in colour, taste, and quality, with almost any of the

mineral springs in England, France, and Germany.

The principal ones in this county are, Epsom, the Dog and Duck in St. George's Fields, those at Dulwich, Streatham, the Iron Pear Tree at Godstone, and that beautiful limpid one at the three-mile stone on the Wandsworth road.

Dr. Saunders says that none of them are sufficiently saline to be certain in their operation on the bowels, unless they are taken in excessively large quantities. It is therefore a common custom to quicken their operation by the addition of some of the same salt as that which gives them their purgative quality: by this means they are rendered so similar to an artificial solution of vitriolated soda or magnesia in common water, that they lose all pretensions to be considered as natural medicated waters. As all of them partake in a greater or less degree of the saline qualities, in containing for their most active ingredient a notable proportion of some purging salt, particularly Epsom salt; a detail of that alone will, I trust, be sufficient to give an idea of their properties.

Epsom water, though now scarcely at all employed in medicine, deserves some notice, as being one of the first of the saline purgative springs that was brought into use, and because the salt to which it owes this property was long prepared from the water, and known all over Europe as a peculiar saline substance, called Epsom salt. It has now partly lost this distinguishing name, and is better known to the chemist as vitriolated or sulphurated magnesia: though as a medicine it still retains exclusively the term of bitter purging salt. This salt

which is so largely employed medicinally, is now prepared from sea water which has been boiled down to procure from it its muriated soda. An uncrystallizable brine remains, which is chiefly muriated magnesia, and by presenting to it the sulphuric acid, under any form of combination, the sulphat of magnesia is readily procured.

The spring that yields this saline water is situated about half a mile from Epsom, a small market town about 16 miles from London, adjoining to a range of chalk hills of great extent, covered with a remarkably fine short turf, affording a very fine course for racing as well as hunting, and forming excellent downs for the depasturage of sheep.

The Epsom water is transparent and colourless, and at first appears scarcely sapid; but on examination, it is found to leave a decidedly bitter and saltish taste on the tongue. It does not change materially by mere exposure to the air, which shews the fixity of that which gives its peculiar sensible property; it keeps well for some months when corked up in clean vessels, but if carelessly kept, it will soon putrify.

With re-agents it shews the following appearances:

Syrup of violets is soon changed green, owing probably to carbonated lime, or especially carbonated magnesia.

The nitrats of lead and silver are rendered white and opaque, and the nitrat of mercury of a deep yellow.

The sulphuric acid disengages a few bubbles of air, but not in any considerable quantity; caustic ammonia precipitates a white flaky earth, which is magnesia.

The Epsom water has not been analysed with any considerable accuracy, but we can easily determine which are the most important ingredients. Epsom waters evaporated to dryness leave a residuum, the quantity of which has been estimated very differently; some make an ounce and a half in the gallon, and Dr. Lucas only five drachms and one scruple. This result seems better to agree with the small degree of sapidity of the water when first taken. Of the total residuum, by far the greater part, about four or five sixths, is sulphated magnesia mixed with a very few muriats, such as that of lime, and probably magnesia, which render it very deliquescent, and increase the bitterness of taste till purified by repeated crystallizations.

About a sixth of the residuum is insoluble in a moderate quantity of cold water, and is probably selenite mixed with a little carbonat of lime. There is nothing sulphurous or metallic ever found in this spring.

Half a pint therefore of Epsom water will, according to the lowest calculation, contain less than a scruple of the Epsom salt, and according to the highest, about double that quantity. On that account the water must be taken very largely, so that to produce the full purgative effect, the patient must take from two to three pints, the one succeeding the other, at short intervals. It operates in a mild efficacious manner in this dose, but in a smaller it rather determines to the kidneys.

With respect to the diseases to which it is applicable, they are precisely those for which Hoffman recommends the Sedlitz water. It frees the body from crude, viscid, acrid, and acrid bilious con-



ments, and it has the advantage of the milder aperients, such as manna, cassia, or senna, in not producing those griping pains and flatulency which often cause so much inconvenience and suffering. When the stomach is filled with crude and ill digested humours, and a tough mucus adheres to its surface, inducing nausea, distaste for food, eructation, swelling of the stomach, and a painful tightness across the breast, nothing sooner relieves these symptoms than Epsom water, which both stimulates the stomach and bowels to expel their morbid contents, and assisted by its bitterness restores the tone of these organs, and with it the appetite and healthy digestive powers.

By the hypochondriacs, by those who are accustomed to a sedentary life, by persons of a plethoric habit of body, and by those who are troubled with those impurities and acrid humours which are usually termed scorbutic, great benefit may be derived from the use of these waters. Females in certain periods of their lives, when attacked by a number of anomalous disorders, may have recourse to Epsom waters for relief with great prospect of success. It is to be remembered, however, that the Bedlitz water is much more strongly impregnated with the vitriolated magnesia, a circumstance of some consequence certainly in a water where the bulk of the requisite dose is always more than can be well borne by delicate stomachs.

The late Dr. Fothergill was a warm friend to the use of Epsom waters and salts, and strongly recommended a residence in that neighbourhood to the valetudinarian. Indeed I have often heard him say that we possessed in the county of Surrey one of

the finest medicines in the world, and breathed the purest air perhaps of any county in England.

#### METALS.

Large quantities of iron ore are found tolerably pure at an inconsiderable depth in various parts of the county, particularly in the parishes of Godstone, Lingfield, and Horne; no doubt from all appearances it abounds in other parts, there is also coal to be found, but at such great depths, and the laminae so thin and so small, as to prevent their being worked to advantage. Formerly there were some extensive furnaces for the smelting of iron ore, which were worked by the Messrs. Raby's, at Felbridge water, who were large iron masters; but the great consumption of fuel which such works require, the dearth of coal which was to be brought by land carriage at a distance of 26 or 27 miles through bad roads in those days; from the great diminution in, and the increasing price of wood; but above all, the cheapness and facility with which the great iron masters of the north could deliver their pig and bar iron in London, and undersell them, it was after a very fair trial found too expensive to answer; and therefore the furnaces, smelting houses, together with all the works, were discontinued, and eventually entirely abandoned. By bearing in mind these considerable works we shall hereafter be able to account for the origin perhaps of the stocking up of woods, &c. in this part of the county, when we come to introduce the subject of timber in its proper place.

**EARTHS.**

**FULLERS EARTH; OR, CIMOLIA PURPURESCENS ET  
VIRIDI FLAVA OF THE NATURALIST,**

This subject of earths, from its general acceptance, may at first sight appear, to those who are unacquainted with it, of too much insignificance to deserve a place in a detail of the agriculture of a county; whereas, in fact, it is of so much real importance, as to be almost the only basis by which our staple manufacture stands at this day unrivalled; and they become so blended and interwoven as it were with each other, that they must almost stand or fall together. Of so much consequence has fullers earth always been held, that we find the Legislature passing a special act in the 28th year of the reign of his present Majesty, chapter 38, prohibiting the exportation of fullers earth and fulling clay under a very heavy penalty; and obliging the dealers and buyers thereof to enter into bonds, to prevent its exportation. Indeed the preceding act is but a necessary consequence of that which was passed, by the 7th of Edward IV, chapter the 3d, where it is ordered, that no cloth shall be exported until it is fulled, on pain of forfeiting the same, half to the King, and half to him that will sue. Under such circumstances as these, and as the earth that is found in this county has always stood pre-eminent, I have endeavoured to make myself acquainted with as many particulars as possible, both as to the chemical properties and qualities of them, as well as their respective value. The chemical character of fullers earth is, that it is a hard dense

marle, moderately heavy, of a very regular and compact texture, of a rough or dry appearance; though when cut or scraped, it is of a very smooth, glassy, and unctuous surface; it does not colour the hands, adheres but slightly to the tongue, melts freely in the mouth, and has a little harshness between the teeth; in water it is easily diffusible, and falls into a soft fine powder; it makes no effervescence with aqua fortis; in the fire it acquires a yellowish brown colour, and a stony hardness. The natural colour of the fullers earth is a greyish brown; but it varies very much, and is found from the pale greyish brown to the dusky and almost black; but generally with a cast of yellowish green, the one is what is called the blue fullers earth, and the other the yellow, by the Surrey pit-men. Its use is to scour cloths and stuffs, &c. it has the peculiar property of imbibing all the tar employed in the external distemperature of sheep, and to soak up all the grease and oil, and other unctuous substances necessarily used in the preparing, dressing, &c. of the wool. It must be freed from sand or rust before it is dry, by scraping it, otherwise such impurities would injure the cloth. Some manufacturers in Gloucestershire, as well as chemists with whom I have conversed upon the subject, affect to say, that soap will answer the purpose equally well, but I have no hesitation in saying that the French are of a very different way of thinking; for as they manufacture soap of the finest and best quality so much cheaper than we do, they would certainly be at no loss in fulling their cloths so as to discharge all those offensive substances, equally well as we do with fullers earth. But I have seen

some beautiful fine cloth exhibited by one of the principal manufacturers at the Louvre, on the first complementary day at Paris, who assured me, after a great deal of conference upon the subject, that it was the fullers earth only which they wanted, and they could then equal, if not surpass, our finest and best cloths. I really am of that opinion too; for before the revolution they were able now and then to obtain enough from this country to convince them of its excellent qualities.

The pits that are most in repute, are those of Nutfield, Reigate, Merstham, and Sutton, with inferior ones near Croydon. The fullers earth is found in different layers or strata, and at various depths, on the sides of the hills. The sorts are distinguished by the names of the blue earth, and the yellow earth, and have each their respective appropriations; the blue earth is required by the manufacturers of Leeds, &c. where our second cloths are made; the yellow is preferred by the clothiers in Halifax, Huddersfield, and that neighbourhood, for the manufacture of kerseymeres. That this distinction is invariably observed I am assured on the authority of Mr. Silva, a gentleman of veracity, and of consequence as a merchant; who is perhaps the largest shipper of earth in London; and to whom I am indebted for much of the information respecting this earth. The broad cloths are therefore fulled with the blue, and the kerseymeres and superfines with the yellow; it is shipped as ballast at the rate of 10, 20, or 30 tons in a vessel consigned to Hull, and there shipped for the place of its destination. The yellow sort is that which is principally sent to Wiltshire and

Gloucestershire; it is shipped in the same manner for Bristol, and re-shipped for the Severn, or conveyed from thence in waggons into Wiltshire. A great deal is also sent by waggons from London for the western counties, at the risk of the waggon masters, who thereby become dealers in it. Whenever they have a light loading, as some of them have had too often, they take in a ton or two to suit their load. It is also used as ballast, and thus often turns to a good account. I have endeavoured to ascertain the annual consumption of the kingdom, and as nearly as may be, find it to be about 6300 tons. Of this quantity I suppose 4000 tons are sent from Surrey. It is carried to the different wharfs on the Surrey side of the water, by carriers, who purchase it at the several pits at about 5 or 6s. per ton, and deliver it to the shippers at about 25 to 26s. per ton. It is always sold by the ten, and is brought in waggon loads of 2½ to 5 tons each waggon, according to the wheels of the waggon, and the season of the year. The principal proprietor of fullers earth is Mr. Edward Russell, of Holland House, Nutfield, a gentleman of intelligence and experience, who farms largely, and is a considerable valuer of agricultural crops and the appendages thereto belonging, as well as timber. But the most valuable earth as to quality comes from the pits of Mr. Dann, in the same parish. The Reigate earth would be very good, but it is often mixed in its stratum with sand, and when that is the case it becomes almost useless. The yellow earth is sometimes impregnated with a dark brown crust, commonly called rust, which the pit-men carefully remove before it leaves the

pit. When this rust happens to prevail, it affects the earth with its bad properties for some distance all round it; such earth is therefore very inferior in value and quality. The layers run generally horizontal, but sometimes more perpendicular; and it is cut out in large masses when pure, of from 50 to 100 pounds weight and upwards.

The demand for the Surrey fullers earth has lately decreased considerably, in consequence of an unexpected rivalship at Maidstone, in Kent, where a pit has been opened about three or four years; it is of the yellow sort, and, being so well situated for water carriage, the proprietor of course has it in his power to undersell the Surrey people. I have not succeeded in my endeavour to get some of it to analyse in time for this report.

The earth undergoes no other preparation by way of fitting it for market, than that of clearing it from every appearance of rust; but as soon as the manufacturers receive it, it is completely dried, and ground in a mill to a fine powder. It often happens that both the yellow and blue sorts are found in perpendicular veins, as it were within a few yards of each other, in the same field, equally distinct in quality as in colour. Of that which is produced at Nutfield, the following are the contents divided into 100 parts.

|       |         |                       |
|-------|---------|-----------------------|
| 46    | 5.....  | Silex.                |
| 27    | 15..... | Argillaceous.         |
| 8     | 7.....  | Lime.                 |
| 1     | 3.....  | Oxyd of Iron.         |
| 1     | 5.....  | Carbonat of Magnesia. |
| 13    | 5.....  | Water.                |
| <hr/> |         |                       |
| 100   | 0       |                       |

In the midst of the fullers earth, and at various depths, is found a stone of different dimensions, very solid and ponderous, of a perfectly transparent bright yellow cast, the edges whereof are sharp, and resembling glass, which, with Dr. Hill, I considered to be of the rhomboidal species of spatum, but upon further examination I found it to be gypsum; it is used for making plaister figures. It is observed to impregnate the earth with a ferruginous, corrosive substance, for some distance all round it; and the pit-men are careful to remove every trace of it, under an impression (but I believe unfounded) that this matter would very materially injure the cloth. In the year 1744 the price of fullers earth was fourpence per bushel at the pits, which is after the rate of about eight shillings per ton.

#### STONE QUARRIES.

In the parishes of Godstone and Reigate, stone is found in great abundance. The quarries have been worked for many years; but the quality of the stone being of a soft tender nature, is principally used as common fire-stone, and about London is sold at 1s. 6d. per foot, cube. In the parish of Bletchingly, at a place called White Hills, a species of stone is found superior to any yet known in England, and equal to any that is found in Europe, for the purposes of the glass manufactory. In its nature it is softer and more easily worked, but requires more caution in working than either of the other two. It is of such a peculiarly fine quality for sustaining the utmost heat, that it is sought after by all the principal glass manufacturers



in every part of the kingdom: large quantities being now shipped for Liverpool and the north. It was principally owing to the powerful effects of this stone, which became known to Mr. Dawson, the original proprietor of the Vauxhall plate glass works, that he was enabled to produce such amazing plates as not only to give his glass a decided preference in England, but to astonish even the French themselves, from whom Mr. Dawson discovered the secret of manufacturing plate glass in the garb of a day labourer. Notwithstanding however the stone is naturally possessed of such an incredible power, a great deal depends upon the manner of building the furnace. Trial after trial has only served to prove that the projectors knew but little of the business; Frenchmen have been sent for, but with as little success; and the Albion plate proprietors, like others of the same profession, after sinking immense sums in erecting works, must have given up the concern altogether, but for the very extraordinary abilities of Mr. Samuel Atkins, of Vauxhall, who was formerly a stone-mason, but who has retired from business. Possessed of great natural talents, quick in conception, and of extraordinary activity in execution, he traced out the art when a boy, and matured it into system in his riper years. I am informed that those manufacturers, who have employed him, can now make plates nearly one-third larger than they could before. These stones are fortunately procured of almost every dimension, some containing not less than 72 feet superficial, of 10 inches thick; such stones are sold at 3s. 6d. per foot, delivered in London; the

more ordinary sizes at ~~£12~~ 12s. to ~~£14~~ 14s. per load of 102 feet.

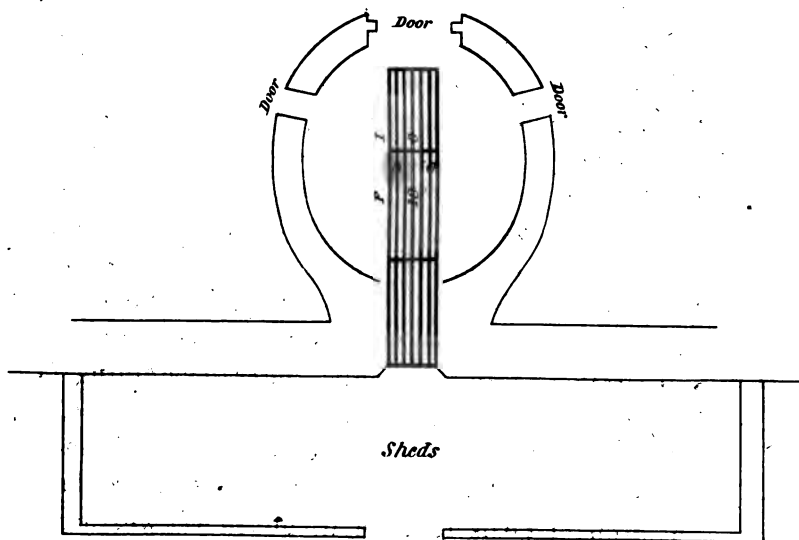
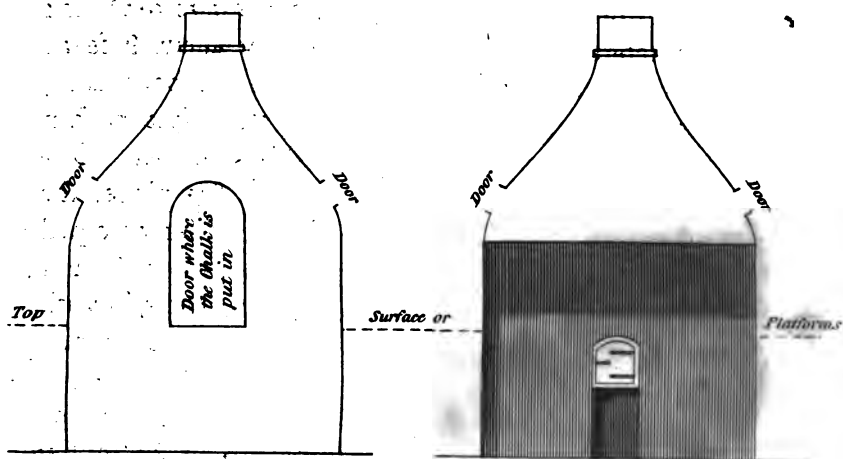
At Gatton, and at Menstham, the stone becomes much harder, and is fit for various other purposes besides fire-stone; it bears however the same price in London as that of Godstone and Reigate. In the town of Reigate under the old castle is a very extraordinary excavation made through the rock or stone, which, as I have said before, is of a soft quality. This excavation appears to have been either Saxon or Norman, and to have been extended to a great length and depth, as the descent is at the entrance very sharp; but where it may terminate is now uncertain, as the work is fallen in at several places. The passage is square, 6 feet high, 4 feet wide, and appears to have been designed for secret- ing the cattle and the effects of the inhabitants; and there is also an oblong square hall, round which runs a bench cut out of the same rock: tradition says, that it was the room where the barons of England met to debate and to settle their plans of operations in their wars with king John. It is I believe the property of Mr. Barnes, of Reigate, formerly an eminent attorney, but now retired.

#### LIME STONE.

Above the several strata of stone which I have just described are several loose beds or laminae of rough sharp angular stones, which appear to have been thrown aside at the time of opening and first working of these quarries. Upon inquiry, I could not learn that they were ever attempted to be calcined or burnt into lime, whereas, upon examination and calcination, I found them to possess every active

unite. The inside form of the kiln at the base is an ecliptic, although they are sometimes oval, the diameters of which are 10 feet by about 9 feet; there are three small doorways about one foot square, which are opened or shut as the air or heat within the kiln is required to be more or less rarified. One of these doors is placed opposite the fire place, the other two are placed opposite each other at equal distances from the center one, and about 3 or 4 feet asunder; the mouth for charging the kiln with the stone is 4 feet wide, is under the center door, and is shaped like a wedge; the fire place is of course opposite to the mouth; it has a cast iron grate and frame, the opening being from 16 to 20 inches wide, the bars to the fire place are let into grooves left in the frame, and are not fastened down, and are placed about half an inch asunder; each of them is one inch and three quarters wide at top, and bevelled off to half an inch underneath, and is between three and four inches deep; the roof of the fire-place is arched over, and the first layer of stone is laid upon that arch regularly, and all the rest thrown in promiscuously; over the fire place is built a shed as well to protect the workmen from the weather, as to keep the coals dry, and also the bags, baskets, and tools; over the mouth is a platform raised for the purpose of seeing the state of the lime while burning, and for the convenience of opening the doors as occasion may require. In wet weather a kiln is not only longer in calcining or burning, but requires more coal: for instance, a kiln holds 38 loads of lime when burnt, at 40 bushels to the load, in dry weather this kiln requires three chaldron of coals to burn it, but in wet weather it

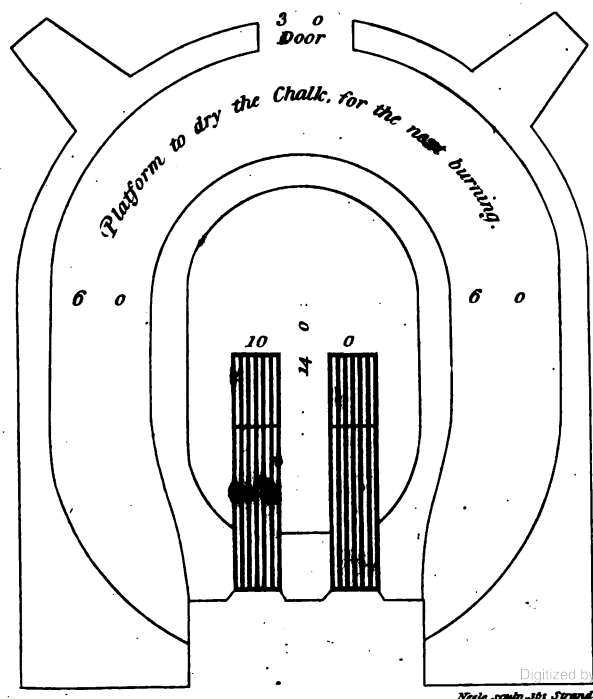
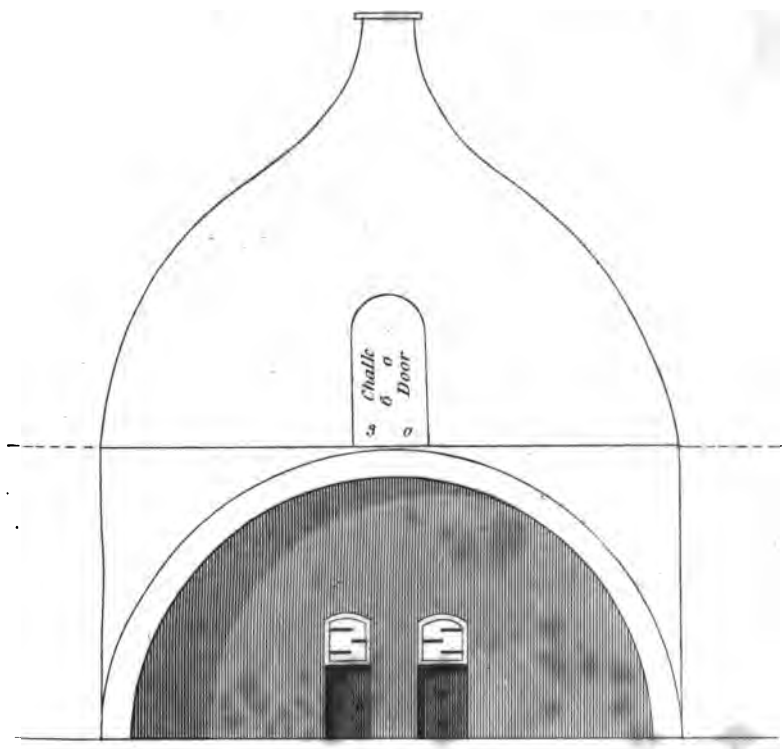
# *Working Lime Kilns. — M<sup>r</sup> Peters ; N<sup>o</sup> 1.*



*Note with 3/4 Strand.*



Merstham Lime Kilns — Mr. Moore N<sup>o</sup> 2.



Scale  $\frac{1}{4}$  of an Inch to a Foot.

Wells sculp. 361 Strand.





will take nearly four chaldrons. Neither wood or charcoal are ever used at these kilns, and they bring their coals from Kingston, generally a back carriage. It takes from 20 to 30 hours, according to the foregoing circumstances, to burn a kiln. These pits employ daily a great number of hands in digging, wheeling, preparing, charging, burning, emptying, and loading the lime; and although they have been worked for so many years, there appears scarcely a possibility of calculating their termination. It is conjectured that this vein runs in a horizontal direction nearly to the town of Dorking, a distance of about half a mile; and as far beyond Denbighs to the south west, making a distance of about one mile and two furlongs; but as the hill ascends rapidly beyond the present pits to Denbighs, it may I think be fairly estimated to yield an average depth of 60 feet perpendicular. It is by some asserted, and I think with tolerable foundation, that equally strong lime stone is found under Box-hill, perhaps at some future day it may be tried. The next best stone is that which is found at Mersham, Sutton, and Carshalton, and an inferior sort at Guildford, but each of them very fit for building, although the latter is more generally used for agricultural purposes upon the strong loams and clays about Budgwick, and the further part of the county. As an article of manure, a more particular detail will be found under the head of lime among the account of manures.

In burning lime stone, when pit coal is used, M. Chaptal directs the furnace to be made of vitrifiable stone, and in the shape of an inverted cone; the furnace is to be filled with alternate layers of coal



and lime stone; and the lime is taken out after the operation at the top. In proportion as the mass subsides, care is taken to supply the furnace at the top in order that the flame and heat may not be lost. It has been proved by Dr. Higgins that the best lime is that which is made with the hardest and most compact stone, broken into small pieces, and heated slowly until the furnace is become of a white heat. This heat must be kept up uniform and regular (which is best ascertained by a thermometer) until the stone is no longer capable of effervescing with acids. The lime becomes over-burned, if the ignition be carried to a greater degree, and the produce is then called frit, which is properly ashes; and this frit is no longer capable of being divided in water, or of resuming with avidity the principles it had lost. When pieces of calcareous stone of different sizes are calcined, the lime will not be all of equal goodness; the small pieces will consist of over-burned lime, while the larger pieces are scarcely altered in their central parts. The best lime is that which is most quickly divided by immersion in water, and affords the greatest quantity of heat in this process, which causes it to fall into the finest powder. Good lime should likewise dissolve in the acetous acid, without effervescence, and leave the least possible quantity of residue. Lime continually endeavours to resume the acid and the water of which the stone was deprived by calcination: consequently when it is left exposed to the air, it cracks, becomes heated, falls into powder with an increase of bulk, and resumes the property of effervescing. It is therefore of importance to use lime that is newly

made, if the mason or builder is desirous of possessing its whole force.

Having given this description of lime, it may not be unimportant here to say a word or two upon mortar, without which many of our farming buildings would be of much less value than they are, and many may be made better.

Mortar is made simply by working sand or other bodies insoluble in water, together with slaked lime, and is used for the purpose of joining bricks or stone together. The sorts of sand generally used are pit sand, river sand, and road sand. The former is almost always altered by admixtures of vegetables and calcareous earth, which weaken its efficacy; the second is purer and better suited for the purpose; and the last being generally the fragments of pulverized flints, or the gravel of flints, is by much the best. The angles which these fragments present, and the roughness of their surface, contribute to give a consistence to the mortar. The hardening of mortar appears to be merely the progressive regeneration of lime stone.

It does not obtain the greatest degree of hardness of which it is susceptible, until it has resumed all the carbonic acid of which the stone was deprived; and this operation is very slow, unless the combustion be facilitated by well known methods, which consist in mixing with the mortar substances which contain either the carbonic acid, or a principle analogous to it, such as vinegar. It is this regeneration of lime stone, which is effected by the lapse of time, that explains to us, why the hardest stones afford the best lime, and why old mortars are found to possess a degree of hardness which modern artists have no

hopes of attaining. This circumstance has arrested the notice and attention of many of our best chymists, as well as architects, and the effect of some of their researches has been to propose, that the lime should be put into a basket, and suffered to slake in the air, as it is thought by this means that it would preserve a greater degree of force, and be less weakened than by the usual processes.

Loriot, in the treatise which he has written upon the subject, has attributed the superiority of the mortars of the antients to the means which they used to dry them speedily; and in consequence of these principles, he mixes powdered bricks with flints, works the whole together with slaked lime, and dries the mass with one fourth part of quick lime. Care must be taken to use only lime which is finely pulverized and sifted; for otherwise, the mortar would crack, and be very imperfect. Before the mortar is thoroughly dry, we often see how easily it is injured by frost, and thereby we are made sensible of the impropriety of doing such work as requires mortar at the latter end of the season, but especially in the winter.

Note, as the lime produced by the Earl of Stanhope is considered to be much superior to that in general met with, it may arise from the following circumstance:

The burning of lime in the large way depends on the disengagement of the carbonic acid by heat; and, as lime is infusible in our furnaces, there would be no danger from too violent a heat, if the native carbonat of lime were perfectly pure; but as this is seldom the case, an extreme degree of heat produces a commencement of vitrification in the mixt

stone, and enables it to preserve its solidity, and it no longer retains the qualities of lime, for it is covered with a sort of crust which prevents the absorption of the water when it is attempted to be slaked.

This is called also over-burnt lime. It is therefore principally by attending to the disengaging the carbonic acid by a regular and uniform heat from the native carbonat of lime that we can produce lime in any tolerable state of purity. Dr. Bryan Higgins has found that burnt bones improve the common mortar very much; and as the mortar prepared according to his direction is certainly the best that can be proposed, we shall shortly notice the composition of it. Take 56 parts of washed coarse sand, whose single grains do not exceed one sixteenth part of an inch in diameter, and 42 of fine sand. Mix and wet them with lime-water, add gradually 14 parts of slaked lime, beat it well together, and lastly, add a like quantity of powdered bone-ashes. Water cement, or mortar, which has the property of hardening under water, may be prepared, according to Guyton, by mixing together four parts of blue clay, six of black acid of manganese, and nine of carbonate of lime; this mixture is to be heated to a white heat, in order to decompose the carbonate of lime. It is then mixed with 60 parts of sand, and formed into mortar with a sufficient quantity of water.

#### CHALK-STONE.

\* The chalk-stone quarries are at Godstone, Catterham, Reigate, Merstham, Buckland, Beachworth, Epsom, Leatherhead, Bookham, Effingham, West Horsley, Clandon, Stoke near Guildford, Guildford, and Puttenham; at each of these places chalk is dug in greater or less quantities, not because the one may

be better in quality than another, but according as the farmers are more or less intelligent, according to the system of farming pursued by them, and according to the qualities of the soil in each of these neighbourhoods, and the difficulty or facility of getting at it, or of procuring other sorts of manures.

The great consumption of chalk is in those tracts of loam and clay lands which extend from Godstone, from Reigate, and from Guildford southerly into Sussex, with all the intermediate country. The greatest demand is for the Godstone and Guildford chalk, which is sold to the farmers at the pits, ready dug, from 2s. 6d. to 3s. 6d. per waggon load, which is at the rate of from 15s. to 21s. the kiln. At the pits in the western part of the county it is sold at 1s. 6d. to 3s. the waggon load.

A kiln will hold six waggon loads of chalk, which, when burnt or calcined, will yield four waggon loads of lime, or 450 bushels; but that depends greatly on the state of the chalk when it goes into the kiln, because, if it is saturated with wet, and of course swoln, it will not yield above 400 bushels Winchester measure.

Chalk is burnt into lime with what are called kiln faggots, which are composed of the tops of the underwood, or the underwood itself of a certain age; and in some places with furze; about 1200 of furze, or 700 or 800 faggots, will burn a kiln; this must depend on the dryness of the chalk, and the season of the year. A quarter of a cord of wood is required to dry the kiln previous to the application of the faggots; the faggots cost at the kiln according to their quality, and the distance from whence they

are brought, from 16s. 6d. to 20s.; the furze from 7s. to 9s. per 100 in the field, the buyer fetching them; the expence therefore in burning a kiln of lime is from £7 to £8.

Wherever the lime is sold by those who make a practice of burning it (and which sometimes happens) at the distance of from 7 to 12 miles from the chalk pit, the price was usually from £10 to £14 the kiln, but is this season sold for £15.

The kilns employed for agricultural purposes are all of the common kind, neither elliptical nor circular, but something between both; they are built with brick, but sometimes with brick and stone, and in a few instances entirely with stone; they are generally placed against a high bank for the greater convenience of charging it, or they are sometimes found upon the commons and wastes sunk in a natural or artificial rise of the ground. The walls are carried up something out of the perpendicular, both without and within to a given height, from whence a sort of dome springs with a large opening at top. The fire place and the opening where the lime is drawn out are one and the same place.

These sort of kilns are only used where wood or faggots are burnt, and they have the insuperable objection of letting a great part of the heat be lost, and of causing a greater consumption of fuel before and during calcination, consequently requiring so much longer time to burn the kiln; it is supposed also, that the lime so burnt is neither so strong nor so good, and as they are generally built on the sides of roads or lanes for the convenience of getting at them, where every man has it not in his power to make choice of an aspect or situation that would be

most suitable for the construction of these very simple erections, so we find them placed with their fronts to almost every point of the compass. It is impossible, therefore, that kilns so circumstanced, can be built upon any thing like a proper construction. I have examined these kilns in every direction. I have very minutely attended to those at Dorking and Nine Elms, and have paid a visit to those at Northfleet, in Kent, for the same purpose; and although I am clear that either of those upon the conical principle are infinitely superior to those upon the common, or what I shall call the agricultural principle, yet I see a great defect in all of them, and as far as I am a judge, they are capable of much improvement.

Before I propose any alteration, it is right that I should give a description of one of the best of the agricultural ones, in which chalk stone, properly so called, is burnt; and I shall also describe one of the conical kilns, so that by a reference to each of them, their distinguishing properties will appear manifest.

The form is nearly circular, having two strong buttresses, one on each side of the fire place, as well to act as a skreen to the mouth of the fire place, as to resist the great pressure of earth against the opposite wall.

|                                                                                             | F. L. |
|---------------------------------------------------------------------------------------------|-------|
| Distance between the two buttresses.....                                                    | 5 9   |
| Width of the buttress in front .....                                                        | 1 6   |
| Thickness of the buttress at the bottom from whence it gradually diminishes to nothing..... | 2 0   |
| Height of the buttress when it meets the perpendicular wall of the kiln.....                | 8 0   |
| From the inside of the buttress to the mouth of the fire place.....                         | 1 2   |
| Opening or fire place.....                                                                  | 2 3   |

|                                                                                                                                                                             | P. | I. |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|
| Height from the ground line to the springing of the arch of the fire place.....                                                                                             | 2  | 9  |
| From the springing line to the center or crown of the arch                                                                                                                  | 1  | 6  |
| Thickness of the wall at the mouth.....                                                                                                                                     | 4  | 0  |
| A small pier projecting in front of the wall and placed between each buttress, and the mouth which I have before described to be one foot two inches wide, the thickness is | 1  | 4  |
| Diameter of the kiln at bottom, taken within side.....                                                                                                                      | 9  | 0  |
| Diameter of the kiln at top, something less than.....                                                                                                                       | 8  | 0  |
| The height of the kiln.....                                                                                                                                                 | 14 | 0  |
| There is a base round the bottom of the wall within, except at the fire place, to build the chalk on, in height and width about.....                                        | 1  | 0  |
| Door way opposite the mouth where the chalk is put in of two feet wide, and in height.....                                                                                  | 2  | 0  |

The outside of the building is cased with stone, all the inside, as well as the piers and buttresses, are of hard burnt bricks. A strong bar of wrought iron is placed all round the front, and underneath the mouth of the arch, in order to prevent the front bricks from being knocked out, or otherwise injured in thrusting in the faggots.

When the kiln is to be charged, an iron horse, as it is called, which is an iron grate, is put in, and upon this the chalk is piled, beginning nearest the wall and over the horse with the largest chalk, and filling up with the lesser until the kiln is completely full;\* when that is done, and should the wind set pretty strong either at the mouth, or at the

\* In many or most of these kilns, this horse is composed only of thick sticks sufficiently strong to bear a portion of the weight of the chalk, while the burner is laying the large pieces of chalk to form his dome over the fire, and for the rest of the chalk to be placed; these layers are nicely poised by means of these sticks put into the ground, and removed as soon as the dome is completed.



as may tend to bring it, or something like it, into general use.

I agree with him, that the improvement of lime-kilns is a matter of great national importance, especially since the use of lime as a manure has become so general, and more particularly so as the price of it is every day increasing, owing to the increased and increasing price of fuel.

In order that his ideas of what he calls a perpetual lime kiln, may be clearly understood, I shall give a full description of it, and if possible a section also. The objects which he had in view, were first to cause the fuel to burn in such a manner as to consume the smoke; this was effected by obliging the smoke to descend and pass through the fire, in order that as much heat as possible might be generated. Secondly, to cause the flame and hot vapour, which rise from the fire, to come into contact with the lime-stone by a very large surface, in order to economize the heat, and prevent its going off into the atmosphere, which was done by making the body of the kiln in the form of a hollow truncated cone, and very high in proportion to its diameter; and by filling it up quite to the top with lime-stone, the fire being made to enter near the bottom of the cone. Thirdly, to make the process of burning lime perpetual, in order to prevent the waste of heat which unavoidably attends the cooling of the kiln in emptying and filling it, when to perform that operation it is necessary to put out the fire. And fourthly, to contrive matters so that the time in which the process of burning is just finished, and which of course is still intensely hot, may, in cooling, be made to give off its heat in such a

manner as to assist in heating the fresh quantity of cold lime\* with which the kiln is replenished as often as a portion of lime is taken out of it.

To effectuate those purposes the fuel is not mixed with the lime-stone, but is burned in a closed fire place, which opens into one side of the kiln, some distance above the bottom of it. For large lime kilns on these principles there may be several fire places, all opening into the same cone, and situate on different sides of it, which fire places may be constructed and regulated like the fire places of the furnaces used for burning porcelaine or earthen ware.

At the bottom of the kiln there is a door, which is occasionally opened to take out the lime.

When, in consequence of a portion of lime being drawn out of the kiln, its contents settle down, or subside; the empty space in the upper part of the kiln, which is occasioned by this subtraction of the burned lime, is immediately filled up with fresh lime stone.

As soon as a portion of lime is taken away, the door by which it is removed must be immediately shut, and the joinings well closed with moist clay, to prevent a draught of cold air through the kiln. A small opening however should be left, for reasons which I shall presently explain.

As the fire enters the kiln at some distance from the bottom of it, and as the flame rises as soon as it comes into this cavity, the lower part of the kiln (that below the level of the fire place) is occupied

\* I apprehend the Count means cold lime stone, or chalk, because it is not understood to be lime until it has passed through the fire in a red heat, and been burnt.

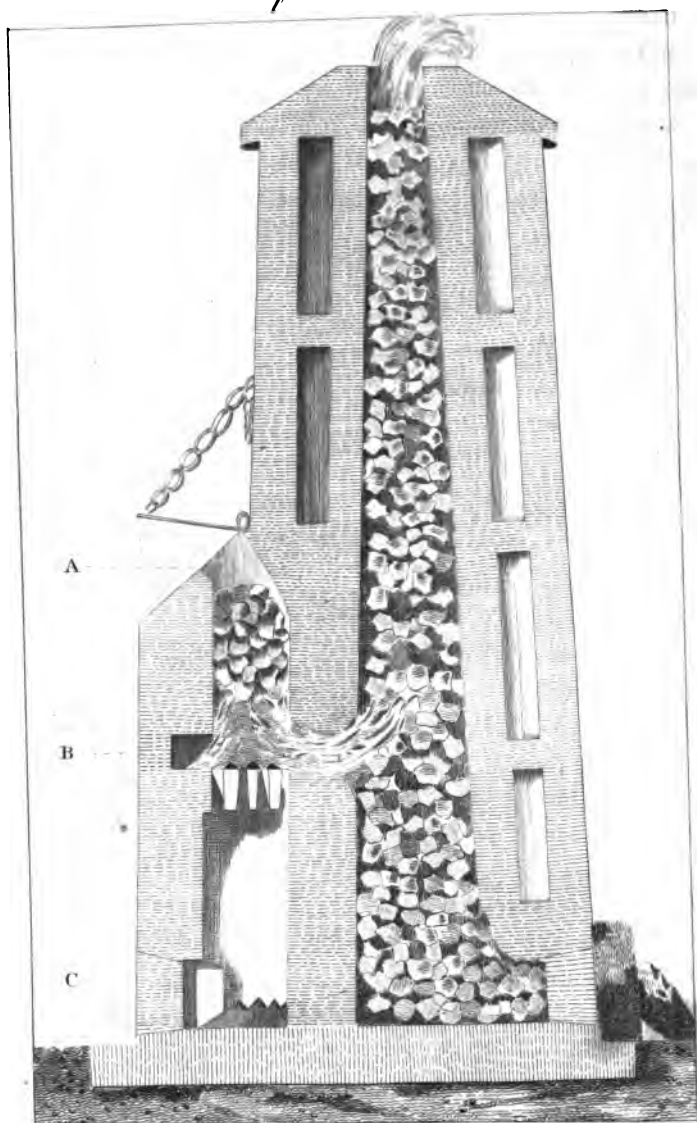
by lime already burned; and as this lime is intensely hot when, on a portion of lime from below being removed, it descends into this part of the kiln, and as the air in the kiln to which it communicates its heat must rise upwards, in consequence of its being heated, and pass off through the opening at the top of the kiln, this lime in cooling is, by this contrivance, made to assist in heating the fresh portion of cold lime stone with which the kiln is charged. To facilitate this communication of heat from the red hot lime just burned to the lime stone above, in the upper part of the kiln, a gentle draught of air through the kiln, from the bottom to the top of it, must be established, which is done by leaving an opening in the door below, by which the cold air from without may be suffered to enter the kiln. This opening (which should be furnished with a register of some kind or other) must be very small, otherwise it will occasion too strong a draught of cold air into the kiln, and do more harm than good; and it will probably be found to be best to close it entirely, after the lime in the lower part of the kiln has parted with a certain proportion of its heat.

The preceding description gives a general idea of the manner in which this kiln is made to operate while in the act of calcination. The following will refer to the section as being descriptive of the several parts of it:

The height of the kiln is 15 feet, its internal diameter below two feet, and above nine inches. In order more effectually to confine the heat, its walls, which are of bricks and very thin, are double, and the cavity between them is filled with dry



# *Count Rumford's Lime Kiln?*



*Note: see 33e Strand.*



Engraved for Malcolm's Agriculture of Surrey Oct. 1805

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wood ashes. To give greater strength to the fabric, these two walls are connected in different places by horizontal layers of bricks which unite them firmly.

A, is the opening by which the fuel is put into the fire place. Through this opening the air descends which feeds the fire. The fire place is represented nearly full of coals; and the flame passing off laterally into the cavity of the kiln, by an opening made for that purpose at the bottom of the fire place.

The opening above, by which the fuel is introduced into the fire place, is covered by a plate of iron, movable on hinges; which plate, by being lifted up more or less by means of a chain, serves as a register for regulating the fire. A section of this plate, and of the chain by which it is supported, are shewn in the figure.

B, is an opening in the front wall of the fire place, which serves occasionally for cleaning out the fire place, as also for cleaning out the opening by which the flame passes from the fire place into the kiln. This opening, which must never be quite closed, serves likewise for admitting a small quantity of air to pass horizontally into the fire place. A small proportion of air admitted in this manner has been found to be useful and even necessary in fire places, in which, in order to consume the smoke, the flame is made to descend. Several small holes for this purpose, fitted with conical stoppers, may be made in different parts of the front wall of the fire place.

At the bottom of the fire place is a grate, constructed of bricks placed edgewise, and under this

grate there is an ash pit; but as no air must be permitted to pass up through this grate into the fire place, the ash pit door, C, is kept constantly closed, being only opened occasionally to remove the ashes.

D, is the opening by which the lime is taken out of the kiln; which opening must be kept well closed, in order to prevent a draught of cold air through the kiln.

As only so much lime must be removed at once as is contained in that part of the kiln which lies below the level of the bottom of the fire place, to be able to ascertain when the proper quantity is taken away, the lime as it comes out of the kiln may be directed into a pit sunk in the ground, in front of the opening, by which the lime is removed; this pit being made of a proper size to serve as a measure.

While the lime is removing from the bottom of the kiln, fresh lime stone should be put into it above; and during this operation the fire may be damped by closing the top of the fire place with its iron plate.

Should it be found necessary, the fire, and the distribution of the heat, may, in burning the lime, be farther regulated by closing more or less the opening at the top of the lime kiln with a flat piece of fire stone, or a plate of cast iron.

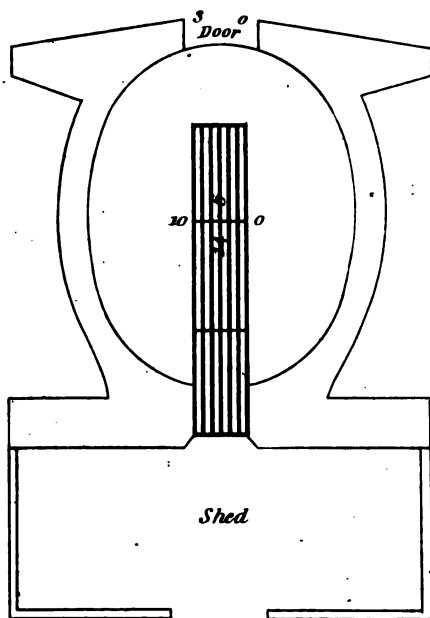
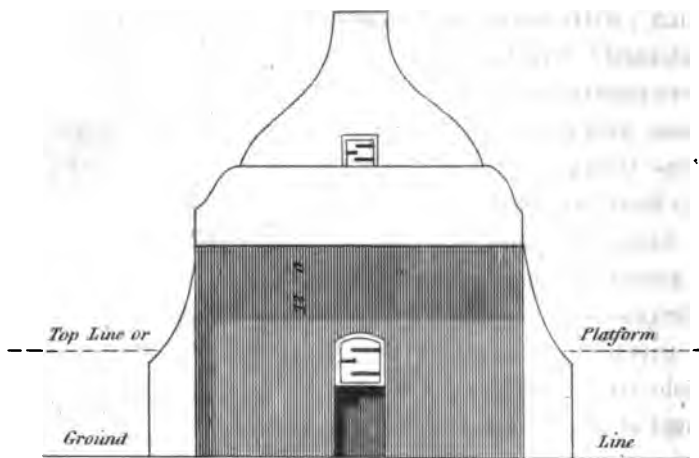
The double walls of the kiln, and the void space between them, as also the horizontal layers of bricks by which they are united, are clearly and distinctly expressed in the figure. The kiln is represented as being nearly filled with lime stone.

Having given a description of the conical kilns at Dorking, under the article of stone lime, I pro-





# *W. W. Saunders's Lime Kiln. N. 3.*



*Scale 1/4 inch = 1 foot.*



pose here to give a plan of one which has been recently erected by my friend Mr. Saunders, and which (with some small alteration hereafter to be explained) will be found to be the same with those above mentioned. As this kiln has been some time in use, and found to answer extremely well, and as it has the advantage of burning much less fuel than those at Dorking, and to calcine the stone in less time also; and as the expence in the materials are somewhat less, the superiority of this over the others cannot but be manifest. Indeed, Mr. Saunders has given it some fair trials, for I was present one whole afternoon at the charging of it, when it had rained all the morning, and kept raining incessantly, so that each of us was wet to the skin presently, and consequently the chalk went in perhaps nearly if not quite in as bad a state as possible, yet the kiln was burnt in 36 hours without vitrifying any of it, although from the continuance of the rain and the deplorable state of the men (there being no shed built to protect them) they were obliged to put the fire out for 12 hours, and the quantity of fuel consumed was only 72 bushels. This kiln holds 420 bushels of lime.

In comparing the construction of these three kilns together, that is the common or agricultural one, the one proposed by Count Rumford, and the one built by my friend Saunders, there will appear a very evident difference. Allowing each of them to be the most perfect that can be constructed of their kind, and supposing each of them to hold exactly the same quantity of chalk, and the chalk with which each of them is charged to come from the same part of one pit, and the greatest attention to be

paid by each of the burners to their respective kilns, I think I could venture to pronounce that the Dorking kiln, or that of my friend, would perform its work in a stile as much superior to the agricultural one as the Count's would surpass his; and this superiority should consist in cheapness, expedition, and quality.

The objection which strikes me to attach to Mr. Saunders's kiln is, first, that the ash hole is very deep and large, and constantly open, by which means there is a large body of cold air constantly rushing in through the grating, which causes the fuel to burn away furiously instead of gradually, because there is no mode of graduating it; secondly, the door of the fire place being made of two plates of iron purposely constructed with an opening between them of nearly half an inch, and as the door is not made to fit the frame correctly, they twist owing to the alternate heat and cold to which they are exposed, and get out of shape, by which means another large body (though not equal to the former) of cold air is admitted; thirdly, as these columns of air must necessarily cause a great draught, and consequently increase the rapidity of the combustion, the fire must of necessity be so much oftener replenished with fuel. Every time the door is opened for that purpose, the cold air rushing in meets with the body of the chalk in a state of calcination, perhaps nearly in a red heat, which instantly turns black, and it is sometime before it again recovers its transparency. In the Dorking kilns the depth of the fire place is at least six feet before it reaches the chalk, so that a great part of the fire is actually wasted by means of the

construction of it, or at least the chalk is very little benefited by it. Mr. Saunders, therefore, shortened the depth in his to three feet, and he finds that the fire by being so much nearer the chalk acts with greater power, and consumes less coals; and if to this be made the addition of iron bars, and the internal frame of the grate, the saving first and last is considerable. In the Dorking kilns there are three small doors of cast-iron, about a foot square, placed at nearly equal distances, and which are situated above the platform; the use of these, I understood by the men, were for the purpose of rarifying the air in case of any apprehension of vitrifying the lime, as well as for the purpose of cooling it the quicker when sufficiently calcined. But Mr. Peters, the proprietor, gave me another reason, which he said was the only use of them, and that was that they gave the burner an opportunity of examining the kiln from time to time, in order that he might see when the chalk was sufficiently calcined; but I think that never could be the sole reason, because two at most would be amply enough for that purpose, and probably even one; the third therefore would be useless. When I examined these doors with their frames I found them all defective in not shutting close; but I was told that this was of no consequence, for the quantity of cold air that could come in there would be soon dispersed by the greater body of hot air that it would meet with; but they did not know that hot air was specifically lighter than cold air, and that the former would be making its way out at the top, while the latter was making its way also downwards, and thereby be continually counteracting the calcination of the chalk; because at any rate the whole

upper surface of it would be covered with this circumambient atmospheric air. These doorways therefore, as they are now constructed, appear to answer no good purpose, but the contrary. Mr. Saunders in constructing his kiln, though he could not satisfy himself as to the absolute use of these doors, made a provision for them, by leaving the openings which he fills with chalk, and faces that with moist clay, and he seems perfectly aware that the less air is admitted upwards the better the chalk burns.

As he is about to build a second, I have promised him a sketch of one which I conceive will obviate the difficulties, and remove some, if not all, the errors of the present. The following is descriptive of it:

The plan I propose is erected on an oblong base, and is marked No. 4; being 14 feet long in the clear by 10 feet deep; it will be observed that I propose two kilns together having a party wall between them, nearly on the top of which is a door having a plate of iron made to fit it, and painted yellow, the use of which will be hereafter explained.

To each kiln there are two fire places, the bars of which go through the building; to each fire place are two doors, the one close to the bars, the other ranging nearly with the brick-work; each of the doors is made to fit as close as possible; between the inner and the outer door I propose a piece of fire stone of sufficient substance to fill up the space at the bottom, and against which the outer door shuts. The ash holes are here shewn open, but I propose to have two doors one above the other made to fit very exactly, only one of which should be open when the

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*Mr. Malcolms Improved Lane Tables, No 4*





chalk is calcining; and when the draft is required to be increased both may be open a short time.

The doors on the side of the building are for the purpose of taking in the chalk to charge the kiln with: the inside door should be iron, the outer one wood, and both should be close fitted and shut during calcination.

Whichever kiln is meant to be burnt, the chimney belonging to it should be closed up by a cap or hood, and the sliding door, which I call the smoke door, marked yellow, should be partially drawn out at first, and nearly quite so, as soon as the fire and the smoke prove the chalk to be burning, as the sliding door will either increase or damp the calcination; the second kiln being supposed to be also charged or filled with chalk, the chalk will by the means of the heat and smoke from the first kiln be so dried as to burn in less time, by 12 hours at least, than it otherwise would without such process.

When the first kiln is sufficiently burnt, which with a little practice may be soon known, and which can at first only be known by opening the side doors, shut the damper close and the ash doors, and the fire will soon go out; the cap may be taken off the chimney; unload the kiln as soon as you can; fresh charge it, put the cap on the other chimney; draw out the damper a little way, and set fire to the second kiln; thus you have one burning and one drying, no waste, fewer coals or fuel is required, and less time is occupied in calcination.



**BRICK MAKING.**

Large quantities of Bricks are annually made in the different parts of this county, particularly near the metropolis. The manufacture has of late years become an object of revenue, and as such is entitled to some consideration; the manufacture is besides of the utmost importance to the community, inasmuch as the value and comfort of our dwellings must depend in a great measure on the quality of the materials with which they are constructed; and bricks form no inconsiderable part of them. I say it is material to us, because if the bricks with which our houses are now almost uniformly built are in quality defective, and if the timber be of a similar description we ought not to place much dependance on the solidity of the edifice. It is not of much importance certainly to know when bricks were first introduced, but as matter of curiosity it may afford a momentary gratification to be informed, that Alfred, who mounted the throne of England in 871, was the first prince who introduced brick and stone buildings to general use, in palaces as well as churches; though it is certain that his subjects for many years after his death were fond of timber buildings.

The soil on the Surrey side of London is only calculated for certain sorts of bricks, and these it must be confessed are inferior to those made in Middlesex: We have neither depth, nor that pure medium argillaceous substance, which is so essential to form the perfect brick; we have either too much silex, or to speak the common language too much flinty sand; and the stones are too abundant, large, and

too near the surface, which causes the bricks to vitrify, and thereby injures their colour and quality: or we have a portion of calcareous matter, which causes the bricks, after being taken from the clamps, insensibly to moulder away by exposure to the air or to moisture; and where it is argillaceous, as in Camberwell and Dulwich parishes, it is to that extreme, as to be impossible to be moulded without the assistance of some adventitious combinations. What those combinations are, which form the several varieties of bricks manufactured in the county, together with some cursory remarks, will form the subject of this essay.

*Synopsis*—At Kennington, at Walworth, at Camberwell, and in Battersea parishes, we have manufactories of bricks, to a much greater extent probably than all the rest of the county united. In analyzing the earth which has been generally used, I followed the plan of the learned Bishop of Llandaff. Eight ounces of earth taken out of the pit as they were digging it, (Mr. Fentiman's) and moulding it into an oblong square, I placed on the hob of a Bath stove in my study, where a constant fire was kept for seven days. I then weighed it, and found it had lost 1 oz. and  $\frac{1}{2}$ . I did the same by that at Walworth, and during the same time it lost nearly 2 ozs.; that at Camberwell lost in the same time 3 ozs. 4 dwts.; that at Battersea, 2 ozs. 6 dwts. In the solution of these earths, after having exposed them to the muriatic, and the acetous acid, it was evident that, besides a large portion of pure argil which the earth at Camberwell contained, there were not less than 18 parts in 100 of iron, a small portion of silex, and about six parts

in 100 of calcareous earth: and it will be seen, that the quantity of water which the clay and the calcareous earth held was considerable; from this I infer that, although the colour of the bricks, and the difficulty and consequent expence in moulding the latter was greatly against the manufacturer, yet, as to the materials, they were far superior to the others in an essential property, I mean durability. Those at Kennington and Walworth were nearly similar in their products, the latter possessing the most argil; and those at Battersea still more, the earth therefore imbibing more moisture, consequently loses more in burning.

The moulds used in making every sort of brick for building purposes, are ten inches in length, and five in breadth; and the bricks when burned usually measure nine inches in length, and four and one-half in breadth, so that the clamp shrinks about one inch in ten. But the degree of contraction (as we have before seen) which clay undergoes in being burned, does not absolutely depend upon the purity of the clay; for as some clay imbibes more moisture than others, if that which imbibes the most is not exposed a much longer time to the frost to divide and separate its particles, and to the heat of the sun to exhale its moisture, than that which imbibes less and is a shorter time exposed, it follows, that while the one will be reduced one inch, the other may lose two or more. Again, the heat of the kiln or clamp, and the situation of the bricks, as to heat, will vary the diminution of the subject to be burnt. It is of consequence therefore, in the making of sound hard bricks, that the clay should be dug two or three

years before it is used, in order that it may be pulverised; and the oftener it is turned and incorporated, the better will be the bricks. The earth should have sufficient time to mellow, ferment, or digest, which will render it more apt and fit to temper; and this operation of treading and tempering ought to be performed more than doubly what is usual, because the goodness of the bricks wholly depend upon the well performance of its first preparation, since the earth in itself, before it is wrought, is generally brittle, full of extraneous matter, which requires to be removed, and as it were without unity and stability; but by adding small quantities of water by degrees to it, and working and incorporating it together, the several parts of it are opened, and by being thus exposed to the atmosphere a tough glewy substance is formed, which, without such tempering, treading, and beating, could not have been produced. I can only compare this preparation of the soil to that of making bread. When there is a due quantity of water put to the flour, and well wrought up together, such bread becomes not only smooth and firm, without having eyes or being subject to crumbling, but it eats sweeter and mellow, and becomes easier of digestion, affording far better nourishment than such as is over watered, heavy, and not sufficiently tempered; provided the other operations, which belong to the making of good bread, such as baking, &c. be properly performed.

Bricks thus tempered become solid, smooth, hard and durable; and one brick thus made takes up nearly as much earth as a brick and a half made in the common way; but these are light, full

of cracks, and spongy, owing to the want of due working and management; and the mixing of ashes which is now the uniform practice about London, and light sandy earth which is usually practised in the country, to make them work easy, and with greater dispatch, serves also to save coals or wood in the burning them.

The excellency of bricks consists chiefly in the first and last operation; for bricks made of good earth, and well tempered, become solid and ponderous, and therefore will take up a longer time in drying and burning than our common bricks seem to require. It is also to be observed that the well drying of bricks, before they are burned, prevents cracking and crumbling in their burning; for when the bricks are too wet, the parts are prevented from adhering together. The best way of ordering the fire is, to make it gentle at first, and increase it by degrees as the bricks grow harder. If those several operations were properly and duly attended to, we should not see such immense waste, and so great a profusion of unburnt and half-burnt bricks, called place bricks, as we constantly find on the outside of our modern clamps. For want of due precaution the fire never reaches them in an equable degree, and therefore they ought to be totally disregarded and laid aside; but modern ingenuity, and the tricks of the builders, have found out a mode of using them, less objectionable to be sure, than if they were consigned to the outside walls, though properly they are not fit to be used any where. It is necessary that the public should be informed, that these place bricks are now made use of in the inside walls of houses of every denomination, from

the hat to the palace; and that they are soft, subject to very quick decay, and wherever wet can at all get to them, they moulder away with great rapidity; nor is this the only objection to them; they are subject to be acted upon by every change of the weather, so that the walls become damp, and the plastering discoloured, causing the bond timbers and plates to rot; and for want of equal solidity with the external bricks, the walls crack, the timbers sag, because the bearing on them cannot be then any where equally poised.

The dampness which so often affects the inside walls is attempted to be palliated, or removed, by the introduction of what is called battening, whereby an opening or cavity is left between the brick work or plaistering; but whoever has attentively observed the result of this invention, which in very many instances has fallen to my lot to notice, will see that the damp arising from these bricks engenders mould, and is visible on the frame of the wood used in the battening; this mould is no doubt the secondary cause of the dry rot, since the origin must be in the bricks themselves.

That this is the case may be deduced from this fact, that wherever a quantity of those bricks is heaped up together, for any length of time, they will upon separation be found to have their bases covered with a fine white net-work, especially those which are nearest the bottom. Hard burnt sound bricks never have this net work grow upon them, let them lay as long as they may in any situation. This net work then is the plantulæ of mould. The origin and increase of mould is nearly in proportion to the heat of the atmosphere; its appearance

and vegetation are never more sudden than during the summer, and the reason seems to be, that the heat of the weather necessarily draws out the redundant moisture from the bricks, for want of a due circulation of air. This moisture attaches itself to the outside of the bricks and there remains, the heat not being sufficient to dry it up, but enough perhaps to produce a degree of warmth; it enters into a slow but certain process of fermentation; and, passing through a state of acidity to putrefaction, is of itself sufficient to engender mould. Sometimes it is very long before mould is produced on particular substances, either from the absence of the seed, or the substance not being well adapted for its vegetation; while in others, the seed has been known to vegetate in three hours. The mould from being first white turns yellowish, and at last blackens. As it approaches a state of maturity, a kind of black dust falls from it, which is the seed of the plantulæ; a quantity of this dust constitutes the powder, which blackens the hand when touched. As this dust and seed is so fine and infinite, it spreads with a rapidity equal to the state and condition of the substances which may be fit to receive it, and hence may attack a whole building, and become the means of endangering and eventually destroying the most superb edifice.

Another fact will confirm this reasoning. In pulling down the most ancient houses not an atom of dry rot has been visible, but merely a decay in the timbers occasioned by age, because the bricks inside and out were alike hard and sound: but where modern ones have been erected on the old sites, a very few years have been sufficient to prove

that symptoms of dry rot have manifested themselves in the basement, from the great degree of humidity which prevails there.

If such bricks therefore are not timely removed, all the art of man cannot prevent the effects of the dry rot: it is the same with certain sorts of stone, which are always damp, be the weather what it may, and there the dry rot makes the greater havoc.

Besides the bricks made at the places before-mentioned, there are some made at Tooting, of common stocks, at Mr. Brodie's; at Croydon, by Mr. Cooper; some very good white bricks, and geometrical tiles, at Reigate, by Mrs. Lucock; at Send Turnpike, by Mr. Daws; at Brook, in the parish of Witley, by Mr. Mitchell; at Wilderwick, by Mr. Avery. The common computation is that every acre will yield one million of bricks, in every foot in depth, which also includes ashes that are usually mixed with it. In general our fields are shallow with a bottom of gravel, yet I think they will average nearly five feet, though I believe we have none that will run 10, 12, or more feet as about Kingsland, at least such is my information, as well as observation.

There is a duty imposed on bricks by three acts of Parliament, of 5s. for every 1000 of bricks, payable by the maker, who is allowed 10 for every 100 when charged in the field, before burned, in compensation for all waste, loss, or damages, and the duty must be paid in six weeks. Also,

|                                                | s. | d. |
|------------------------------------------------|----|----|
| For every 1000 plain tiles .....               | 4  | 10 |
| For every 1000 pan tiles, or ridge tiles ..... | 12 | 10 |



|                                                                          |       |
|--------------------------------------------------------------------------|-------|
| For every 100 paving tiles, not exceeding 10 inches square .....         | s. d. |
|                                                                          | 2 4   |
| If exceeding 10 inches, an additional duty of                            | 4 10  |
| For every 1000 tiles, other than the above, by whatever name known ..... | 4 10  |

The price is as under :

|                                      | s. | s.             |
|--------------------------------------|----|----------------|
| Best washed malm or marl stocks..... | 50 | to 60 per 1000 |
| Seconds .....                        | 40 | to 50          |
| Picked grey stocks.....              | 30 | to 36          |
| Common ditto.....                    | 26 | to 30          |
| Place ditto .....                    | 21 | to 24          |
| White bricks.....                    | 64 |                |
| White geometrical tiles.....         | 64 |                |
| Red tiles .....                      | 40 |                |

#### MANUFACTURE.

Bricks are made by the thousand, as the most satisfactory mode between master and man; and a handy man can mould in one day, viz. from five in the morning until eight at night, 5000. To assist him in the preparation of the soil, &c. from the heap (which is usually dug after the season for brick making is over and laid up) there is generally a gang consisting of six persons; one man (but sometimes a woman) tempers and prepares the soil, which is done with a hoe made long, in the shape of a mattock, a shovel, scoop, a thick plank or board, and a cuckhold; with the hoe he pulls down the soil from the great heap, which is chopped backwards and forwards with the shovel, to turn it as often as may be necessary, to mix and thoroughly incorporate the ashes and soil together (because it is to be understood that at the time the soil is dug out, and made into this heap, a layer of coal ashes is alternately placed between a layer of soil, as of-

ten and in such quantities in each layer as the quality of the soil and other circumstances may make necessary.) The scoop is used to throw water over this portion that is pulled down with the hoe, in order that it may become more and more in a tempering state, more soft and ductile; and with the board he kneads it together, over which a certain quantity of sand is thrown, and it is then covered with pieces of sacking or matting to keep the sun and air from it. A boy of 10 or 12 years of age scoops or cuts off a slice with an instrument or shovel having a short handle, and the blade of it made concave, called a cuckhold, which he brings on his arms to the moulding-table, which is placed under a moveable shed, upon which a girl of the same age rolls out a lump somewhat bigger than will fit the mould, the table having been previously strawed with sand. The moulder, after dipping his mould into dry sand placed at one corner of his table, throws the lump prepared by the girl into the mould, and with a flat smooth stick about eight inches long, previously dipped in a pan of water, strikes off the surplus soil; he then immediately turns out the contents of the mould upon a stand or board of the same size with the brick. A boy takes it from thence, and places it on a light barrow, with a lattice work frame fixed over the frame of a long barrow, at about three feet high above the wheel, and reduced to about 18 inches in height towards the handles, forming an inclined plane. The new made bricks are placed on this lattice frame, and over them sand is thrown in sufficient quantities to prevent their adhering to each other, as well as to prevent in a certain degree their crack-

ing in drying while on the hacks. A girl wheels the barrow to the hacks, and places them with great regularity and dispatch one above the other, a little diagonally, in order to give a free passage to the air. Each hack is made wide enough for two bricks, to be placed edgways across, with a passage between the heads of each brick; they are usually made eight bricks high, the bottom bricks at the end of each hack are usually old ones.

In showery weather, wheat or rye straw is carefully laid over the bricks that are drying on these hacks, to keep them as free from wet as possible: for the brick-makers do not here, as in places more distant from the metropolis, go to the expence of roofed coverings, or long sheds, which from the extent of one of these fields would be impossible.

If the weather is tolerably fine, a few days is sufficient to make them dry enough to be turned, which is done by resetting them more open, and turning them; and six or eight days more are required before they are fit to be put into the clamp, for kilns are not in use in this part of the county. When sufficiently dry, the clamp-maker levels the ground, generally at one end of the range of hacks nearly central, making the foundation of the intended clamp somewhat higher than the surrounding ground; and with place bricks, if they have any unsold, or otherwise with the driest of those just made, makes a foundation of an oblong form, beginning with the flue, which is nearly a brick wide, and running straight through the clamp. In this flue dry bavins, coals, and cinders (vulgarly called breese) are laid and pressed in close, in order that the interstices between wood and coal may be

properly filled up. On the sides of the flue, the bricks are placed diagonally about one inch asunder, and between each layer of bricks three or four inches of breese are strewed, and in this manner they build tier upon tier as high as the clamp is meant to be; never omitting between each layer, as well as between each brick, that is placed diagonally, to put a due portion of breese. When they have made the clamp about six feet long, another flue is made similar in every respect to the preceding, to the extent of the size of the intended clamp; provided only that the bricks are meant to be burnt off quick, which they will be in about 21 or 30 days, according as the weather may suit. But if there is no immediate hurry for the bricks, the flues are placed at about nine feet asunder, and the clamp left to burn off slowly. When fire is set to the clamp, and it burns well (the ash-hole being placed at the west end generally) the mouths are stopped with bricks, and clay laid against them; the outsides of the clamps are plastered with clay if the weather is at all precarious, or the fire burns furiously; and to the end against which addition is made to the clamp, skreens made of reeds worked into frames about six feet high, and sufficiently wide to be moved about with ease, are placed to keep off the weather, and against any particular side where wet is most prevalent. On the top of the clamp a thick layer of breese is uniformly laid.

This is the mode of manufacturing the common grey stocks for walls and common buildings; but some brick-makers, in order to mix the soil and ashes more regularly, perform it with a machine, called a clay mill, which a horse turns round. This

machine consists of a tub or tun fixed to the ground, in which is placed perpendicularly an instrument resembling a worm or screw; the soil being put in at top is worked down by the rotatory motion of the worm, and is forced out at a hole made on the side near the bottom of the tub. A man supplies the tub with fresh soil, properly moistened, while the person who supplies the moulder keeps removing that which is thus prepared, or pressed out.

Washed malms, or more properly marls, are made with still greater attention: a circular walled recess is built about four feet deep and from three to four feet wide, paved at bottom, and from 10 to 12 feet diameter, having a horse wheel placed in the centre; the ground is raised all round it, and a platform made upon a level with the top of the recess. On this platform the horse walks, a pump is fixed into a well, as near to the platform as may be, to supply the recess with water as often as occasion may require. A harrow made to fit the recess, and thick set with long iron teeth, well loaded, is chained to the traces of the horse, who drags this after him; a man wheels a barrow full of soil previously prepared in a heap the same as for the common stocks, and shoots it regularly round the recess, he then pumps a certain quantity of water, which, by means of troughs or shoots, runs on it, and sets the horse in motion. The harrow being loaded accordingly, forces its way into the soil, admits the water into it, and by thus tearing and separating it, mixes the ingredients at the same time that it gives an opportunity for stones and other ponderous substances to subside to the bot-

ton. The man keeps supplying it with fresh soil and water until there is a sufficient body in the recess. On one side, but as near to the recess as possible the ground is made smooth, and dug out about 18 inches or two feet deep into a hollow square; and the soil now becomes paste, and being thereby sufficiently washed, purified, and fluid, troughs are placed from the recess to this hollow ground, and it is ladled out with scoops or shovels into the troughs, carefully leaving the sediment at the bottom of the recess to be afterwards thrown out on the sides of it, together with stones, bones, &c. Over this hollow square or pit the fluid soil diffuses itself, where it settles of an equal thickness, and remains until wanted for use, the superfluous water being either evaporated or drained from it, by its being exposed for a certain length of time in so thin a body. When they have got a sufficient quantity of washed earth in this pit, another is made alongside of it, and so they proceed until they have got as much thus prepared as they are likely to want during the season.

The clamps for burning these better sort of bricks are individually the same with the others, but greater care is taken in not overheating the kiln, but in causing it to burn moderately, as equally and as diffusively at the same time as possible.

In the country, bricks are always burnt in kilns, whereby less waste arises, less fuel is consumed, and the bricks are sooner burnt. The bricks are first set or placed in it, and then the kiln being covered with pieces of bricks or tiles, they put in some wood to dry them with a gentle fire; and this they continue until the bricks are pretty dry, which

takes up two or three days, which is known by the smoke turning from a darkish colour to a transparent smoke; they then leave off putting in wood and proceed to make ready for burning, which is performed by putting in brush, furze, spray, heath, brake, or fern faggots, according to the scarcity or plenty of some of those articles in the neighbourhood. But before they put in any faggots they dam up the mouth or mouths of the kiln with pieces of bricks, which is called in some places shinlog, piled one upon another, and close it up with wet brick earth.

The shinlog they make so high that there is but just room above it to thrust in a faggot; they then proceed to put in more faggots, till the kiln and its arches look white, and the fire appears at the top of the kiln; upon which they slacken the fire for an hour, and let all cool by degrees. This they continue to do alternately, heating and slackening till the bricks be thoroughly burnt, which is usually effected in 48 hours. One of these kilns will burn 20,000 bricks, and is usually 13 feet long, by 10 feet six inches in depth, and the height about 12 feet. The walls are carried up something out of the perpendicular at top, and inclining towards each other, so that the area of the top is not more than 114 square feet; the thickness of the walls are one foot two inches.

The bricks are set on flat arches, having holes left in them something like lattice work.

Goldham observes that bricks will have double the strength if after one burning they be steeped in water and burnt afresh.

As every man who has occasion to use bricks,

whether on his own estate, or on that of his landlord, cannot but be sensible of the great value of a perfectly dry house; and as I think I have shown that it is impossible a house can be dry if bricks are used which are insufficiently burnt, such as the place bricks I have before described, he will do well to consider whether it will not be more advantageous to him in the end, to make use of no other than the very best hard sound bricks, be the colour of them what they may, and be the cost what it will. Such bricks are easily known by their sound, and by their striking fire with steel. It will be found that, besides the comfort and firmness of the building, they will be cheaper than place bricks, together with the expence of battening the walls.

In the interior of the county tiles are almost uniformly used for roofs of houses, and in some instances on barns; but between Dorking and Horsham a heavy but very durable sort of slate stone is used. Nearer London slates either Welch or Westmoreland prevail. As there are many persons who give the preference to tiles, it may not be amiss to know the result of a curious experiment on that subject as related by the Bishop of Llandaff, in the 4th vol. p. 314.

“That sort of slate, other circumstances being the same, is esteemed the best which imbibes the least water; for the imbibed water not only increases the weight of the covering, but in frosty weather, being converted into ice, it swells and shivers the slate. This effect of frost is very sensible in tiled houses, but it is scarcely felt in slated ones; for good slate imbibes but little water, and when tiles are well glazed they are rendered in



same measure, with respect to this point, similar to slate. I took a piece of Westmorland slate, and a piece of common tile, and weighed each of them carefully; the surface of each was about 30 square inches; both the pieces were immersed in water for ten minutes, and then taken out and weighed as soon as they had ceased to drip; the tile had imbibed above a seventh part of its weight of water; and the slate had not imbibed a two hundredth part of its weight; indeed the wetting of the slate was merely superficial. I placed both the wet pieces before the fire; in a quarter of an hour the slate was become quite dry, and of the same weight it had before it was put into the water; but the tile had lost only about 12 grains of the water it had imbibed, which was as near as could be expected, the very same quantity which had been spread over its surface; for it was the quantity which had been imbibed by the slate, the surface of which was equal to that of the tile; the tile was left to dry in a room heated to 60 degrees, and it did not lose all the water it had imbibed in less than six days."

The finest sort of blue slate is sold at Kendal for 3s. 6d. per load, which comes to £1 15s. per ton, the load weighing two hundred weight. The coarsest may be had for 2s. 4d. a load, or £1 3s. 4d. per ton. Thirteen loads of the finest sort will cover 42 square yards of roof, and 18 loads of the coarsest will cover the same space; so that there is half a ton less weight put upon 42 square yards of roof when the finest slate is used, than if it was covered with the coarsest kind, and the difference of the expence of the material is only 3s. 6d. To balance in some measure the advantage arising

from the lightness of the finest slate, it must be remarked that it owes its lightness, not so much to any diversity in the component parts of the stone from which it is split, as to the thinness to which the workmen reduce it; and it is not able to resist violent winds so well as that which is heavier.

A common Cambridge tile weighed 37 ounces: they use at a medium 700 tiles for covering 100 square feet, or about  $2\frac{1}{4}$  tons of tile to 42 square yards. Hence, without including the weight of what is used in lapping over, &c. when a building is covered with copper or lead, it will be seen that 42 square yards of building will be covered by

|                    |        |
|--------------------|--------|
| Copper.....        | 4 cwt. |
| Fine slate.....    | 26     |
| Lead.....          | 27     |
| Coarser slate..... | 36     |
| Tile.....          | 54     |

From the foregoing statement it is evident that the consequences arising from a covering with tiles are two fold, the first, that owing to the weight of them we are obliged to make our plates and rafters of the roof so much stouter and heavier than there is any occasion to do for slates even the coarser sort, and consequently this increased strength in the timber must add to the expence of the roof, supposing that the same thickness of wall be sufficient. Secondly, it is proved that from the porosity of the tile it imbibes one seventh part of its weight, or above five ounces of water in ten minutes, and that it requires the heat of 60 degrees, which is five degrees above temperate, and six of those days to make the tile as dry as it was before it was so

turated. How much longer the tile may continue wet, during the moist winter months, if it ever dries at all upon the roofs of our houses, is a question I am not prepared to explain. But I think it appears pretty evident that such tiles lodging on timber in a state of dampness, at least for six months, must injure such timber, and together with the unburnt or place bricks in the walls cannot fail of producing an almost perpetual moisture, and make a house damp and unhealthy at nearly all seasons.

#### ESTATES.

*The land how occupied, in what manner managed, and farms how proportioned.*

In the distribution of property throughout the kingdom at the time of the first invasion of England by the Saxons, we find that the conquered lands were parcelled out among the followers of some particular leader according as their abilities to serve might entitle them; but the whole was considered common property which they were all bound to defend. But when William the Norman came over, he divided many of those estates which had before been seized by the Saxon leaders among his Norman followers; under the pretence, that many of them had fought against him, and he partitioned out the lands into knights' fees, which contained four hides of land, an indeterminate number of which formed a barony, which led the civilians to define the term thus, "*Merum, mistumque impèrium in aliquo castro oppidove concessione principis.*" After which period, many of these allotments were distributed among the monasteries,

abbeyes, and other religious houses, and other divisions became portions for the female branches of families, whilst a considerable part was reserved and held by the crown. The value of its land and its produce about this time, according to Bishop Fleetwood, was as follows: an acre of land was worth one shilling; a hide of land which contained 120 acres was 100s.; a palfrey, which in modern language might be analogous to galloway, cost 10s.; a sheep was estimated at 1s., an ox at 6s., a cow at 4s. I shall presently shew the value of each at this time of day; without attempting however, to shew the difference in the value of money, which is beyond my ability to do. At the time of Henry the eighth, these monasteries and religious houses were dissolved and the property sold to assist in defraying the expenses of a voluptuous prince, and a luxurious court. From this period, property became more divided and more diffusive, it admitted the little purchaser as well as the great, and as it ever has been the pride of an Englishman to be free, and to have his bit of freehold land, on which he might build, plant, or cultivate as his fancy led him: so we find, that as manufactories encreased with commerce, so did the means increase of acquiring this species of favourite property. Thus encreasing and dividing, we find it parcelled out at this day throughout this county into innumerable hands, none very large, a vast number of middling, and a great many small proprietors. It cannot I presume be expected, that I should detail either; a few of the principal ones only, I shall attempt, and range them according to their rank, not according to the

extent of their possessions, and in omitting the rest I hope I shall stand excused :

**His Royal Highness the Prince of Wales.**

**His Royal Highness the Duke of York.**

**His Grace the Duke of Norfolk.**

**The Right Honourable Earl Spencer.**

**The Right Honourable Earl Onslow.**

**The Right Honourable Lord Viscount Midleton.**

**The Right Honourable Lord King.**

**The Right Honourable Lord Grantley.**

**The Right Honourable Lord Somers.**

**The Honourable Lord William Russell.**

**Sir George Shuckburgh Evelyn, Bart.**

**Sir William Clayton, Bart.**

**Sir Frederick Evelyn, Bart.**

**Sir John Frederick, Bart.**

**Joseph Windham, Esq.**

**Levison Gower, Esq.**

**William Lock, Esq.**

**Col. Mark Wood.**

**Robert Ladbroke, Esq.**

The management of the landed property of this county, as well as those of many other countries, must be sincerely lamented by any man who is at all conversant with the best practices of husbandry, who is a judge of the value of land by knowing what it is capable of doing, and is otherwise master of his profession. I trust I may be believed when I state that I have had nearly £500,000 of landed property through my hands, either on sale or to value, within the last four years; and I assert it as a fact, that a great part of that property was depreciated 10, 15, and 20 per cent. by bad leases making bad

tenants, by arbitrary clauses never enforced, by such a confusion of repitious jumble as neither landlord or tenant could understand, old practices of two crops and a fallow, and compelling the tenant to lime and chalk, and marle, where either would be destructive; in short making one sort of lease suitable for all sorts of soils, and all sorts of men. I shall produce an instance from many, of a large farm the property of a gentleman in this county: the estate was worth £14000, when the tenant went to it seven years ago, the lease was drawn up by an attorney in the country, and the covenants as he shrewdly said, and as they all say, were agreeable to the custom of the country. Before the first seven years had expired, the estate was reduced in the opinion of two eminent land stewards to £10,000, and the longer he continued, it is probable the worse it would have become, and little more than that sum could be obtained for it. I knew however, that if the tenant could be got out of the farm, although he had 14 years to come of this lease, it was worth while so to do, at almost any sacrifice, that the estate would be worth £18,000, and so it proved. It therefore appears, that although the consequence of tying up a farmer's hands, by unnecessary restrictions and obsolete practices and letting him break through a few of the covenants of his lease, which he is sure to do if left to himself, appear at the time of no great moment, yet when that estate comes to be looked over and valued by men of experience, upon opposite interests, those seemingly trifling nothings, are sure to be pointed out, laid hold of, and insisted upon as so many deteriorations,

and reduce the quantum of its proper value just in proportion as the injury is likely to be more or less permanent. Every gentleman of landed property knows what it is to have a bad tenant, but if you add to this a bad lease, the consequence is dreadful: Even a bad lease with a good tenant makes the latter often think of what he never would have dreamt of before, and if applied to at any time to correct any proceedings, or if for some particular purpose you wish for a corner of a field, he gives you to understand that he knows what sort of a lease he has got, and will only do as he pleases, and that he must be well paid for any sacrifices that he may make. I will take one simple case, suppose that the late Duke of Bedford, with all his ideas of improvement in husbandry, had let a farm for 21 years upon certain conditions, which might be talked over, and desired the farmer to go to his agent and solicitor (as I mean not the slightest offence by the application, I hope I shall stand excused, because in the first instance I know that his grace was unlike other noblemen and gentlemen, and would not have given such directions to any man, without seeing to it himself, for he very prudently attended to his own affairs, I also know that his solicitor is a gentleman who very properly ranks very high in the profession) and draw up a pair of leases; the solicitor would naturally enough, unless he received instructions from some quarter or another, refer to the former lease of the farm, and after including the substance of the conversation, would make the rest a counterpart of the old lease; now if such lease was executed by the parties, and this man was following the old customs of the country, which the

Duke's penetration would soon discover, what would have been his disappointment and chagrin? The duke would perhaps say, I intended that you should farm so and so and you understood me so, but upon referring to the lease, he finds that not the smallest notice is taken of such intentions, he has therefore no alternative but to coax the man into a compliance, and indemnify him from the consequences of not abiding by the tenor of his lease; but it does not end there, for after indemnifying the man for breaking some of the covenants to please him, the farmer may ignorantly or incautiously break through some of the other covenants as may be convenient, and upon being found out, he has a right to expect to be indemnified for his infractions in his turn. But should it be particularly required of such an agent to look over the estate as agent at any particular time, which otherwise he would do once in seven years; provided the house and buildings appear in good repair, and the hedges and fences in good condition, and if the rent be paid regularly, he is satisfied, while at the same time, a serious injury may be doing to the farm; Any honest man may be a receiver, any good professional man may draw leases, after every covenant has been submitted; but these two men, uniting their skill together, cannot tell whether an estate is properly managed according to the covenants, whether it is over or underlet, or whether it is made the most of in an agricultural point of view. Let gentlemen of the law be the receivers, and the solicitor, if you will, but not the land-stewards, for estates will never be properly managed either to the advantage of the landlord, tenant, or the pub-



lic, while the three classes are held united in the person of the solicitor. If therefore the lawyer is an improper person to manage landed property, how much more unqualified is the clergyman. The various duties of his function in a large parish, one would suppose were amply sufficient to occupy all his time, without devoting himself to a profession of which, it may fairly be presumed, he cannot have had time or opportunities to acquire a competent knowledge. He must be liable to be imposed upon on all occasions, and through him his principal. It is inconsistent with the clerical character, and ought not to be permitted. One of the largest estates in this county is thus managed.

#### FARMS, HOW PROPORTIONED.

Farms are of all sizes according to the nature of the soil, which very properly governs in some degree the point. In the environs of London, land becomes almost too valuable to be farmed; it is either occupied by the nurseryman, the gardener, or the gentleman, properly speaking some opulent merchant or tradesman whose business may require him to be some days in the week at his counting-house, in London, and during the others he amuses himself at his villa. The largest farm within the distance I am speaking of, is that of Mr. William Adam, at Mount Nod, near Streatham, without a lease, if my information is correct, yet he has laid out in building I apprehend not less than 7 or £8000. Upon the clays the farms run from 30 to 360 acres, upon the chalk they are from 60 to near 600 acres, upon the sandy loams from 40 to 450 acres, upon the entire sands from 50 to 150 acres, and upon

mixed soils from 40 to 1400. I reckon that 170 acres will average the county. The largest farmer was the late Mr. William Ashby, of Woodmanstone, who held at the time of his death about 1200 acres; he was a shrewd sensible well informed man, active, generous, kind, and perhaps, without disparagement to the rest, he was altogether the best farmer in the county; he was looked up to by, and his house was the resort of, every farmer who wanted his advice in case of difficulty, and being their friend when alive he generally was requested to perform the last offices when dead; for he was executor to more men than was either convenient or agreeable to him, but his benevolence always got the better of any personal consideration. He fell a martyr in the very prime of life to his over anxiety in business for the benefit of a large family who live to lament so severe a loss. I offer this tribute of respect to the manes of a man, whom I regarded as an honest man and a friend, and who was an ornament to society. If I may judge of the management and operations of his farm, by the conduct of his head man, who lived with me in the same capacity, I am sure that nothing could excel it; for more method, order, regularity and attention could not be in any man. The present largest farmer is, I believe, Mr. Morris Birkbecks, of Mornborough, a gentleman who unites superior skill and knowledge with no small degree of order, regularity, activity, exertion, and perseverance, and whose live stock, farming utensils, and system of husbandry are superior to those of most men in the county; from the above statement it does not

appear that we have any reason to apprehend danger from the size of the farms in this county.

We are constantly told that the prevailing practice of engrossing farms is very injurious to the state, as prejudicial and unfavourable to population; many elaborate treatises have been written, each attempting to prove this assertion, and many very sensible well-informed men are of the same opinion; but experience, that great arbiter of all our doubts and assertions, proves the contrary, by shewing that the *vis generandi* is altogether governed by collateral causes, whether it arise from improvement of tillage, from climate, soil, trade, fisheries, or other favourable circumstances. Whoever will look back into the history of this country will find that in the days of the Henrys and Edwards it was the uniform practice to eject the tenants out of the small corn farms, and to join them to others to increase their magnitude; as it was found that without the assistance of the abbeyes and monasteries they could not support themselves. Upon the dissolution of these, the farms were again enlarged and have been increasing ever since, yet we find that population has increased notwithstanding the latter circumstance, and even notwithstanding the introduction and vast use of spirituous liquors; and in proportion as they have been extended so has agriculture proportionably flourished.

That the increase in the size of farms has not decreased population, I account for in this way, that industry and frugality are among the characteristics of an agricultural life. It is I believe admitted, that industry is beyond all doubt a

more efficacious cause of plenty than any natural advantage of extent or fertility; and we know that frugality will, to a certain extent, supply the place of, or prodigality counteract the effects of, the natural or acquired subsistence of a country. Industry, therefore, uniting with frugality, enables the farmer to enlarge his capital and to extend his business. The same industry with frugality increases his property; he finds himself enabled to provide with ease for an increased family, and to settle them hereafter with advantage in other professional pursuits. But this increasing prosperity does not rest with him alone: by extending his cultivation he requires a greater number of labourers to effect his improvements; better encouragement is given to them; and where the heart gladdens population will follow. We have a striking proof of this in the case of Rome; for so long as their habits of industry continued, frugality enabled them to grow corn enough for their country, they were populous and wealthy; but as soon as it became the fashion for the citizens to be fed from the great granaries of Egypt and Sicily, they became more effeminate in their manners, less industrious and frugal, and eventually so much less populous, that the *justitium liberorum* was an expedient which could not counterbalance the absence of those great and valuable qualifications.

#### MANSIONS.

We can reckon in this county some of the most ancient, and some of the best houses in the kingdom. Surrey was always a favourite residence of our kings and queens, for we find that among our first sovereigns their palace was to be found in such

a place as the Borough of Southwark, which was probably antecedent, or at any rate coeval with the Savoy, or any other in Middlesex. There was one at Kennington, known by the name of Edward the Black Prince's, (the estate of which at this time is in the Prince of Wales,) besides the palaces at Richmond and Kew. The metropolitan of all England, the Archbishop of Canterbury, has a most ancient and venerable palace at Lambeth, where he constantly resides; the Bishop of Winchester has another at Farnham. We very far excel the county of Middlesex, as indeed we do every other county in England, in number, if not in elegance of the buildings of the noblemen and gentlemen, merchants, bankers, and opulent traders; many of whom amuse themselves with farming; and if they do not get richer by it, yet, provided there is no sensible loss, it is a never failing source of the most rational entertainment that can be met with; and as they in general farm with spirit, readily catching at every new improvement, with ideas extended beyond narrow bounds, in general these improvements are tried, and whether successful or not, it gives the neighbouring farmers an opportunity of seeing them performed, of noticing their effects, and of pursuing the same if they think them to their advantage. So far the increasing residences of these men do good, but like every thing else they have their alloy. The price of land immediately rises beyond the reach of the moderate, and often the rich farmer; the price of meat, butter, poultry, &c. increases also, and the introduction of luxury and extravagance finds its way through all ranks in the neighbourhood, to the frequent distress of the industrious shop-

keeper, which in a national point of view is a serious and alarming circumstance. Who would have expected 20 years ago, to have found the land from Kennington turnpike to Tootingworth, at that time not more than 12s. per acre upon the average; now letting, some for £10, but none under of 4 per acre, and rather likely to increase than to diminish.

#### FARM HOUSES, APPENDAGES, &c.

In some parts of the county the most ancient farm houses are found built wholly of brick, with a heavy covering of slate stone of large dimensions; others, of a sort of brick nogging and tiled; others of timber framed, and filled up with clay walls, which when well executed is a most excellent plan, such houses being cooler in summer and warmer in winter than brick, stone, timber, boarding, or nogging. They are sometimes tiled, at other times thatched. Others are composed of a framing of wood lathed and plastered, or rough casted; but both of them very liable to crack and fall in pieces by the shrinking of the timber letting in the damps, when the frost lays hold of parts and disunites them from the main body, thereby making the building always wanting repair and always unsightly; many of the barns and other out-buildings are built with clay walls, with great heavy thatched roofs. I am no advocate for these walls to barns; for if the corn heats at all in the mow, should it be got in damp, which in catching weather and a hurrying time is unavoidable, that part which is nearest the wall is sure to mould. A great deal was spoiled in this county about four years ago in that way. In a wheat barn it may

almost always be prevented by keeping a passage open all round; but that is attended with a great loss of room, which is a great object where barn room and staddles are short. And in a barley or oat barn these passages cannot be kept, because, in filling the mow it requires continual treading the same as hay, and this operation is frequently performed by a horse. Timber barns are therefore so far the best, although not so durable; but almost all the foundations are laid with brick, stone, or flints; and they are mostly thatched. Scarcely any farm yard that I know of, in the possession of a tenant, is laid out in any sort of form or shape; as if regularity in building was not as proper as good order in the farm. The buildings appear to have been erected for the purposes of convenience certainly, but so completely without uniformity, that one would imagine they were so contrived to disgust the landlord, and every reasonable man, from looking at them; for it most often happens that these sort of exertions are made by the farmer who has no idea of building, the landlord giving himself little or no trouble about the matter; and therefore in order to prevent being continually teased into a compliance with the farmer's request, about additional buildings, he consents to find the rough timber, the farmer to find the labour. The latter therefore, in order to erect them as cheap as possible, tacks them to some of the old buildings, no matter whether in or out of the square or in what direction they may be, and thus we account for the irregularity of the old yards throughout the county. Rick yards should be properly attended to, both as to convenience of situation, and to ex-

poore. The ground should be level, all the corn should be placed on stone staddles, or frames, or upon solid brick frames placed in right lines of an octagon, circular, or oblong shape. Those at General De Lancey's, at Effingham, are unexceptionable. The bottom of the farm yards correspond with the inequalities of the buildings; they are either up and down, full of holes, or they are upon an inclined plane, or with a large pond on one side of it. In the first instance, the yard that is full of holes is always dangerous when well littered down; in the next place the straw that is in those holes rots, whilst that upon the hillocks is as dry as when first laid on; but the inclined plane is worse than that, for its position draws all the moisture to the lower side, as may be seen at a yard beyond Tilbuster, to the injury of the upper side, although they take the precaution of having the cribs generally placed on the higher side; and by allowing the pond to be in the yard, and always below that yard, the moisture from the stables as well as from the yard itself, in other words the sullage, naturally drains into it, making the water filthy for cattle to drink, diseasing their body and legs by washing in it, and robbing the straw of that very essence which is to convert it into good and useful manure. I once was of opinion that a very gentle shelving yard to the middle in the form of a very shallow bowl, the buildings being placed all round it, or at least three sides of it, and at rectangles, was the best, but my own experience has taught me better. A good yard should be a dead level, its bottom coated if possible with chalk, or some impervious body that will prevent the urine or mois-



ture from fermenting in the smallest degree. By moving the cribs regularly about it, the whole yard becomes alike saturated, which should be frequently cleaned out and the dung laid upon some fresh soil, lightly shook up, to promote fermentation. In a good yard, the horses and cattle should be kept separate, but changing places every now and then, which I have seen practised to great advantage in Sussex, for stock will be observed to eat the litter that comes out of the stable with great avidity, and I never heard that it did them any harm; by which means nothing is lost. There is a great objection to thatched covering to all buildings, for although if nicely and well executed it looks neat at first, and is warm, yet it not only is quickly acted upon by lightning, but is always a lodgment for vermin, whether rats and mice, or sparrows, who make great havock in it; when it gets old too it is liable to be blown off, and nothing looks more shabby. The best and most durable covering is plain tiles for all buildings well bedded. Another unfortunate circumstance for most farmers in this county is, that their houses and barns are placed at one end of the farm, which if it is of any magnitude, is always attended with great loss, particularly in a dripping harvest or seed time. I would in those cases advise the farmer, wherever it is possible, to lay down the most distant fields into permanent pasture, or as often as he can into seeds of different sorts, and those nearer home should be broke up and kept in tillage; he will find a great saving in labour.

In the common fields the houses are always detached, sometimes in a town as Ewel, Epsom,

Carshakton, Effingham, Bookham, Horsey, Meroe, &c. sometimes at a distant farm. As these fields are now begun to be inclosed, I would recommend to the serious attention of the proprietors, wherever their allotments are sufficiently large to make one farm, to pull down the old farm house, the barns, and the buildings, if in a street, town, or lane, and to remove them to some central spot in the new inclosure. I have done so in two or three instances, and it is wonderful how such a farm will be sought after in preference to one whose buildings may be more detached; it will also bear a larger rent than one with more conveniences in another place. Next to the conveniences of buildings, the farmer should be particularly attentive to sweet water, which, though it should by no means be in the yard, yet should be as near to it as possible. And if there is unfortunately no natural spring, the pond may be always kept supplied from the roofs of the buildings, which should have gutters carried along them to receive the rain water, which may easily be conveyed to it. As I recommended chalk for the foundation of the yard, I more particularly do so for the bottom of the pond: it is sweeter and softer and more purifying to the blood than either spring water or water that stands upon clay or gravel; but whatever be the water, or the bottom, great care should be taken that the pond be made close and tight.

Another advantage to a farm I would also submit to proprietors, which is to plant shaws of from  $1\frac{1}{2}$  to  $2\frac{1}{2}$  rods wide along the north and east sides of their largest inclosures, particularly those intended for pasture. In an open country the climate

is thus made more temperate, which not only improves the herbage, but the cattle also; it besides supplies the tenant with constant materials for hurdles, &c. and saves him the expence and trouble of going about the country to purchase them.

Another great convenience about a farm are pounds, which should be so placed that one pound may serve four fields. They are particularly useful in case of accidents to the sheep or cattle; or in case of their being wanted to be examined by the salesman or butcher, thus saving the inconvenience and loss of time of driving the cattle to the farm yard.

A pond should invariably be made at the corner of every grass field for the cattle, and as recommended for the pounds, may be each placed so as to serve four fields; a clump of trees in a pasture field, planted on a dry and rising spot, is a very desirable thing in hot weather as affording shade and shelter.

#### COTTAGES.

As an appendage to a farm-house, these very necessary buildings cannot be dispensed with; they were originally, I apprehend, built as they are now, upon the wastes and commons, and either by stealth or by the connivance or instigation of the officers of the parish. And it would seem that to such an alarming degree had these encreased, that it was thought necessary in the good old days of Queen Bess, to pass an act in the 31st year of her reign, c. 7, to prevent any person from building a cottage except in market towns, &c. unless he laid four acres of freehold ground or land of inheritance to it, but

however, in the 15th of the present reign, c. 32, it was thought that this statute of Elizabeth tended to lessen population, and was in other respects very inconvenient to the labouring part of the nation, as it laid them under great difficulties to procure habitations. We may therefore with submission date the inconveniencies which are now found to exist, in no small degree to the abolition or repeal of the act of Elizabeth, and the very universal sanction and toleration which this act of George III. passed nearly 30 years ago has given to the poor. I am certainly of opinion that this class of people should have their proper residence, and I equally think that according to the size of the farm there should be as many cottages, upon all parts of it, (as may be most convenient) provided for as many families as such a farm can be supposed to employ, to each of which a good garden should be allotted, and a certain allowance of milk every day from the farmer, the whole to be comprised in the lease to the farmer as the means of insuring their services, and keeping them tolerably honest: had the legislature introduced such a clause as that in the act, and had obliged the landlords within a given time to build these cottages, we should not now have felt all the clamour and inconveniencies which are experienced by the present encroachments; for the labourer in every class of manufactures and mechanics are much more conveniently situated in villages or towns, although perhaps they may not be so healthy thereby. As I may have occasion to touch upon this subject again, when we come to consider the article of wastes, commons, and timber, I shall only further observe, that there appears a very ma-

most erroneous opinion formed of the rights of commonage, which are claimed by cottagers, namely, that, because they have assumed a right and followed up the practice, which may have appeared of no great moment to the tenants *sine molestia*, of feeding so many geese upon the common, they have as indubitable a right to an allotment of it upon an inclosure as the lord of the manor, the freeholder, or the copyholder, and in this light it seems to have been considered by many commissioners. I have but seldom acted in that capacity it is true; but I have often been engaged to protect the indefeasible rights of the proprietors, and I have more frequently found the question of right abandoned by the commissioners, as a thing which those people could not support, and that of policy or prudence substituted; by which system of moderation, however unfair, these cottagers often obtain allotments, which being now so frequently repeated in consequence of the numerous inclosures taking place in some counties, particularly Bucks, where I am much concerned, it has induced a claim to be so strongly made by the cottagers, and so many precedents called in to support it, as to become no longer policy but a matter of necessity; no acts of the commissioners however, although they may to a certain extent be sanctioned by the legislature, and the quantum of allotment to these cottagers may not be worth the disputing, yet no act of theirs, however extensive their powers may be, will justify them in giving away a property which may have been established by ancient prescription, and vested in the lord of the manor by certain grants, as well as in the freeholder or copyholder; for although the term com-

mon, in its fullest acceptation, may be understood to be something that belongs to all alike, quod ad omnes pertinent, or a right that one man has to put his cattle on land that belongs to another, yet as that right must have been defined, and confined to certain lands and property in the neighbourhood, perhaps in the original grant to the lord of the soil, it could not be supposed to include all surreptitious property which might spring up hereafter in that neighbourhood; because by inattention, or in the absence of the principal proprietor, that right might in time be frittered away to a mere nothing, to the serious injury of such a man's family; but the great Locke defines the term, and confines it also, for he says, that it is a property equally to be participated by a certain number; even the appellation of the term common in gross, will not give the cottager the right which has been assumed; for if I understand it, it only means that a man without having any land at all to his cottage or tenement, may have a liberty of commonage, but that must be either by grant to him or his heirs, or by prescriptive right; if therefore, the cottager's claim is surreptitious, that is in plain terms, if his cottage was erected without the consent of the lord of the manor or his agent, acting by his orders, and either by stealth or connivance of the parish officers, that does not give him a right of commonage, nor a right of allotment upon an inclosure, although he may have fed 100 geese, a cow, and some hogs upon it; but policy may grant him that allotment which right could not sustain.

## LEASES.

The leases of this county are of various descriptions, some depending upon the permanent or temporary interest which the lessee may have in the property; others depending upon whether the fee is in the church, or in some college, or in some corporate body, and some look forward to some distant improvement, either by parcelling out the property for building upon, or to accommodate those at very extravagant rates who may have already built, especially if the situation happens to be within a few miles of the metropolis, near to any market town, or to an improving and increasing village. We have under all these circumstances therefore, leases for terms of 7, 14, and 21 years, we have also many leases for lives, held chiefly under the church, and we have farms without any leases at all; my business will be to explain, as well as I can, these several sorts of leases, with their usual covenants, and state their operative tendency to promote or to depress the great pursuits of agriculture.

Leases are a certain compact entered into between a landlord and a tenant, and should be, as far as the nature of the case can be, mutually advantageous, the landlord gives up and resigns for a limited time his right to the use of the soil, upon being paid a certain valuable consideration; he has a right to exact as a condition to be performed by the tenant, that he shall conform to such and such covenants, and he has a right to have his estate returned to him again, at the expiration of that period, certainly not worse than when he let it, but

generally in better condition, or otherwise the tenant does not farm it properly; and he also has a right to say, that in case all or any of these conditions are not complied with and fulfilled, he shall, as soon as these infractions are discovered, have his estate back again, with an equivalent also for the deterioration. If a tenant, after having had due time to look over the particular covenants with his friends, and which his landlord has made *à sine qua non*, and with his eyes open signs a lease that may in many shapes operate to his own injury, he can blame nobody but himself; but the mischief does not however end here, for besides ruining himself perhaps he may also ruin the estate. The intention of leases could only be to protect the property of the landlord against the rapacity of a bad tenant, and a good tenant against the whims of a troublesome capricious landlord; wherever these are clearly drawn up without any room for quibble, at a fair and full rent, a lease for a term of years is a most valuable title to landlord, tenant, and the community; but unless the land is in exceedingly good condition at first entry, nothing short of 21 years should be granted. In the second division of leases, for lives, they have their conveniences as well as inconveniences, they are upon the whole disadvantageous to the lessees, and far from being so advantageous to the lessor as they might; of course the public benefit is so much lessened: and in order that this point may be clearly understood, for I have had a great deal to do in the valuation of this property, I will endeavour to explain myself as fully and as briefly as possible. I have said that these estates upon lives are more often disadvantageous to te-



nants than advantageous to landlords; and that my opinion was, in the first instance, that every lease should be mutually advantageous. Now let us see the interest of the two parties, the lessor and the lessee, what is the value of each of their shares, compared with a freehold estate of 30 years purchase? And first a leasehold estate for three lives of £100 per annum, subject to a reserved rent of £5 per annum, and suppose the lessor to demand one year and a half rent upon the renewal of every life: by the usual calculation of lives, a single life is held to be equal to 14 years purchase; but it frequently happens, where the nominees do not live in any town, or are not of any dangerous occupation, that three good lives will hold out upwards of 60 years, of which there are several instances in this county. Allowing however the average number to be the fairer calculation, they will amount to 45 years; therefore, the lessee will have 45 years profits of the estate, supposing that he does not choose to renew at all. This £100 per annum, after deducting the reserved rent, gives us £95, which at 30 years purchase is equal to £2850. Now the value of £1 at 5 per cent. to be paid after the lapse of the above 45 years comes to 2s. 2½d. so that £2850 at 2s. 2½d. is £309 13s. 9d. wherefore the value of the lessor's right in such an estate, is £ 309 13s. 9d. and that of the lessees comes consequently to

£2540 6s. 3d.

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£2850 0s. 0d.

Suppose therefore, and in order to remedy the inconveniences attending these sorts of tenures,

that the lessee could have the fee simple invested in him, and that in lieu of paying fines upon renewals, he was to have the estate charged with a given annual rent which might be made equal in value, and which would be infinitely more advantageous to both lessor or lessee than the present contingent plan. In order to effect this upon a fair and equitable basis, it appears to resolve itself into a very simple demonstration; for as we have proved the lessor's right in this property to be worth £309 13s. 9d. which, after the rate of £3 6s. 8d. (which is the interest per centage that land bears at 30 years purchase) will come to £10 6s. 5d. and a fraction, let this sum be paid in lieu of fines. But again, suppose in this estate of £100 per annum subject to the rent as before reserved of £5, and where it is customary to allow the lessor a year and a half's rent upon the renewal of a life, which, having deducted the reserved rent, will amount to £142 10s. for the lessor's fine, and this divided by the single life, or 14, the result will be £10 3s. 6d. (which proves very nearly that the value of the said fine per annum is about what I have before stated, and therefore my position is not far from being correct,) which sum added to the reserved rent, is what the lessee will have to pay out of £100 a year, as a fixed and permanent rent, in consideration of having the fee simple invested in him. But there is a hardship in the manner of collecting fines that are arbitrary, which those only that have experienced them can be aware of. In some instances two years improved rents are demanded, in others the best horses, cows, oxen, and the like are taken: all these are negative terms, and involve the parties

in many serious difficulties; for example, one of the nominees dies, it may be the tenant's life, or that of his wife or child; but, as if he or his family were not sufficiently afflicted by this severe but natural visitation of God, the steward of the manor comes directly, and marks the best animals upon the premises, and these may be brood mares or stallions, as in the case of Sir Ferdinand Poole's Waxy, of inestimable value, or they may be Young Shakespeares out of Mr. Paget's famous breed of bulls, some of Mr. Bakewell's, or some oxen ready for Smithfield equal to Mr. Westcar's, or they may be a parcel of lean Welsh or Scotch runts, proportioned to the abilities and circumstances of the times or the tenant. Now why should not a more certain and positive exaction be made, something defined and determinate, proportioned to the annual rent; and this might easily be done, for if 14 years is allowed to be the value of a single life, the fine will be found to be one-third part of the share which the lessor hath in such an estate; and if more than that is required, it is the undoubted interest of the tenant not to renew at all. At present however, in this county, it is usual to take one year and a half's rent, to which are to be added the fees to the steward of the manor, amounting to 8, 10, 12*l.* or more, according to the custom of that manor. Having pointed out as well as I could, the value of this property to both parties, in which there is an apparent advantage on the side of the lessee, in some instances, let us bring their two interests into a narrow compass, and see how they stand to a farmer, who knows nothing of the calculation of chances, and who considers the lease of three lives

nearly equal to freehold, with the exception however of an annual rent. Now provided these lives are all young and healthy, he begins a very spirited system of farming, and lays out his money freely in manuring, draining, chalking, marling, building, fencing, or the like: by some such fatality as I know to have happened in some estates which I have valued in the west of England, these lives drop off very unexpectedly, and very quickly, what then must be the consequences to the family of such a man, by such an unforeseen circumstance? My readers will naturally see nothing but ruin and misery, unless he can find friends to assist him. Let me here then ask this question; is it prudent in any man to pursue a spirited system of farming upon a lease for lives, while he is liable to such contingencies, and if he is not, is not the public very great losers by every such lease. But suppose that these lives hold out the 45 years, or perhaps a great deal longer, does not the lessor suffer a very great diminution of property, by receiving no more than the reserved rent during his life; nay sometimes it has happened, in particular estates, that the lessor has received no rent or equivalent at all. Under either of these circumstances therefore, the public are sure to be the sufferers, because neither party will choose to run into any expensive improvements. Should the country be open, cold, and wild, like Bagshot Heath, would it be prudent in either, nay would it be likely that either would attempt, to circumscribe such property by belts of trees, or to plant any in the divisions; the lessor we are sure would not, because perhaps he may have only a life interest in it himself; and were the lessee to do it, he would

hereafter have to pay for the money he had so expended. Therefore, viewing the subject in whatever light you will, it is neither advantageous to the lessor, the lessee, or the public; whereas in every political view of it, each of them ought upon a certainty, without reservation, to be gainers: and taking it up in this manner, although it would materially affect the present laws of the land in regard to estates, yet there is no more reason why an abolition of the tenure of leases upon lives should not meet the sanction of Parliament, than acts which relate to inclosures, and similar improvements in political economy. A lease for life cannot be made so as to commence in futuro, for this reason, that Livery (which is where the grant is not made on the land, but only in sight of it) cannot be granted or removed by power of attorney, but by the parties themselves. The form is thus: the lessor says to the lessee, "I grant you yonder land, enter and take possession of it."

Those farms which are without leases are in a situation truly unfortunate, in whatever light they are viewed; and although we have a solitary instance in this county of so great a confidence of a tenant in his landlord, as to induce him to sink a very large capital on so precarious a tenure, yet it is but fair to hope that a landlord so circumstanced has honourably guarded against the event of any dissolution of life, by a grant, or by some express act, to secure to such a tenant a term of years commensurate to so large a property thus invested upon his estate; if not, the folly and weakness of the proceeding can only be laid at his own door. I repeat that farms without leases are truly

unfortunate things, and I am sorry to say, that in this county as well as in every other that I travel, they are gaining ground most rapidly and lamentably, but I must confess that the farmers have in a great degree brought the misfortune upon themselves. I am compelled to speak as I find things, not as I would choose them to be: the great crops of corn, its dearthness, the excessive value of stock have made poor men rich, and many a rich man covetous and overbearing. There is at all times a certain charlishness and obstinacy with a disposition perfectly unaccommodating in the farmer that has been low bred and without education; if his landlord wishes for any particular accommodation he cannot grant it without a great deal of hesitation, reflection, and reluctance, although the object be ever so trifling, and then he takes some consideration to the grant of present or future considerable value; but perhaps if he either intends or thinks he must leave the farm at the expiration of his lease, he will in that case not grant it at all, though his landlord should be disposed to pay him almost as much as the fee simple for the accommodation. There are not many in this county I am happy to say of such a disposition; I have however met with two or three instances, particularly during this survey. In Worcestershire, Buckinghamshire, Gloucestershire, Dorsetshire, and Sussex, I have met with several. Is it therefore to be wondered at, that gentlemen, who are disposed to be, and who have been, kind landlords, (but whether they have or not is not material,) and who have been foiled in an attempt to improve the beauty or the conveniences of their estates by the

unaccommodating temper of a tenant, should determine from thenceforth, never to put it in any other tenant's power to refuse them whatever they may think proper to require? I think it is not, and hence it is, that I know (for I have been present where such a declaration has been made by a large party of gentlemen) that several gentlemen never will grant any leases, although they know that by so doing they will not make so much rent by one-third as they would otherwise do by granting leases. Could the disadvantages attending such a resolution be simply confined to the parties themselves, the landlord and tenant, the consequences would not be material to the public, but as that cannot be the case, they will very probably be alarming at some future day, should such a turn of thinking and acting gain ground among our great landed proprietors. The only possible reason why agriculture has flourished so much in England, and has attained its present pre-eminent rank in the eyes of all Europe, and why our neighbours the French are so far behind us in the management of their farms, is the security which leases have given to our farmers; and the want of them accounts for the miserable situation which the French farmer has always been in. Reverse however the scene, and I do not hesitate to say that the French farmer will soon be in the situation that our farmers are now in, both as to management and as to property; while ours will revert fast to the present situation of the French, in spite of all our knowledge and capital. The French farmers, with a great many of whom I have conversed very lately, I am sensible, do not want

skill or inclination to exert it, and some have exerted themselves at all risks, but the consequences have been such as to prevent a repetition; but let their landed proprietors give them permanency and security in their farms, by well adapted leases, and a little management or relaxation of rent for the deficiency of capital, and such is the quality of their soil and the favourableness of their climate, that they would soon make a different figure from what they do now. But with all our skill and capital, where no leases are granted, or where leases clogged with restrictive, ridiculous, obsolete customs prevail, what is the state of our farms under such circumstances? what has however every person employed by the Board said of them? they are in general, I assure them, no better than the French farms are at this time; they are in no instance so clean, and so free from rubbish, for in this point I think the French are a pattern even for our good farmers. In a political point of view, therefore, I am free to say that landlords and tenants should give way so far to the general good as not to make private differences become public losses; for without some such mutual concessions and accommodations it is impossible that either the one or the other can do as well for themselves as they might or ought; and consequently a distance, if not an animosity, is kept up between them to the serious injury of every party. Landlords, as composing the higher classes of the community, should recollect that they hold the ground for the advantage of the public weal, and as such are only guardians or trustees, because they might take it into their heads not to let their estates at all, but to let them go to ruin; such an event



however could not be tolerated in a free country.

Another cause why a general dislike appears to have taken place with regard to leases, is the careless and insecure manner in which they are oftentimes drawn up; and so at variance is one part of the lease found to be with another, that a landlord stands no sort of chance of a remedy either at common law or in equity against a bad tenant; for if the cause is tried at the assizes, the jury may be nearly all farmers or connected with them, and they have a fellow feeling for one another in spite of their consciences. If it comes into Westminster Hall, the landlord will find a host of honest farmers come up to support the integrity and skill of their neighbour; who proving the custom of the country, and so forth, the landlord is sure to be foiled, unless the transaction is of such notoriety as not to be got over, but then his ignorance and other excuses will be brought in aid to lessen the quantum of damages; and this may be what the landlord did not want, but the farm, and to get rid of the tenant. Indeed among all the leases which I have seen in the county, I have never met with one more concise, more plain to the common understandings of mankind, more free from the technical jargon of the law, which only serves to puzzle and confuse, than one drawn up by those eminent notary publics, Messrs. Atkinson and Robson, of the Royal Exchange, London; every particular covenant was explicitly laid down, in plain, honest, intelligible language, and that is the only way in which they should be done, and not in a hand

writing and in a language that lawyers only can read and understand.

Under all these circumstances of leases, the board will naturally see that next to freehold tenure, the lease for at least 21 years is the only one that will justify any well meaning tenant to risk his capital in improvement, or rather not in improvement, but in pursuing a fair and steady sort of husbandry; but if he is expected to improve Bagshot Heath, by inclosing, marling, &c. if he is required to reclaim some of the bogs in the same neighbourhood, or to make any permanent or lasting, but expensive improvement by draining or planting, &c. he ought to have a lease commensurate to the extent of the undertaking. In all cases where I have been concerned, where an old tenant has quitted a farm in bad plight, I have advised the landlord, and it has been always acceded to, after ascertaining its fair rent, to begin moderately and increase the rent every seven years, and it will be found to have this good effect, that a young man, upon taking such a farm, may have got 2 or £3000 to stock and take the crop, and he must sink a great deal the first seven years to clean it and get it into condition, but if he is to pay the full rent of £500 a year, during the whole term of 21 years, he must sink under it, perhaps, if the seasons are untoward; when if he was to pay but £400 the first seven years, £500 the next seven, he could afford to pay even £600 for the last seven years; the landlord in fact gets a greater rent and both parties are accommodated thereby.

## RENT.

In a county so near to the metropolis, and containing such a variety of tenantry, and such a variety of soils, it is next to impossible that land of the same quality can every where bear the same price; we know indeed that it does not, and for this reason, every inch almost of the county that is situate within half an hour's drive of the stone's end, is laid hold of by the opulent trader, placeman, or builder; some of it however, is still held by a few nurserymen, gardeners, cowkeepers, and brickmakers, but the whole of this division will average £6 per acre, some of it letting as high as 10 or £12 four miles from London. Beyond this distance, to one hour's drive, I think it will average £3 10s.; beyond that, upon the chalks it will average near 20s. per acre, upon the clays about 16s. and upon the sands about 16s.; this, as far as I could collect, appears about the medium present rent. There are, as there always will be, farms and places exceeding these rents considerably, and others as much below what they really ought to be; and whether they are at present too high or too low, I am satisfied that the Board will hardly expect me to give an opinion, such even as they are in the clayey district. It was with the utmost difficulty that many old and formerly respectable small farmers could stand their ground three years ago, owing to the heavy burthen of the poor's rate, amounting as I well know to 18 and 20s. 6d. in the pound, at a valued assessment, and the accumulation of other taxes, many of them were obliged to apply to the parish for relief, and several after

parting with their all, were obliged to go into the workhouse; perhaps every one of them were honest respectable characters, born on their farms, with two or three bad seasons for those soils, together with the weight of taxes, entirely ruined them; indeed in the lower part of this county it was a most lamentable scene and circumstance, and such as I shall never forget.

#### TITHES.

In a case of so much magnitude as the tithes of this county, which, besides being a corn county, contains the first hop district in this kingdom, perhaps in the known world, I hope I shall stand excused if I give to the subject its due consideration.

I have always lamented the dire effects of tithes, and the immense injury which the continuation of them is to the agriculture of the county: but having had occasion to see the full operation of their baneful effects in some instances as a valuer only, and in one, as a collector of them in kind; I may at least speak of them as I have found them. It is not material to this generation to be informed, at what period of our history tithes were first instituted, but it is of some importance to know for what purpose they were originally designed, which I shall briefly notice in the sequel. It is sufficient that they exist, and that they are sanctioned by the laws of the land. It is with great submission, however, that I presume to say, that no law of whatever magnitude it may be and of whatever standing as to time, should at this time of day remain, when it is proved by every day's experience to be partial in its operation, oppressive and insufferable in the

highest degree to a certain class of subjects ; injurious to the morals of the people and to the welfare of the state, and often proves unjust and insufficient to those whom it was intended to benefit. It is partial, because it affects only and draws its revenues from the land almost exclusively, instead of making it pay only its proportion with every other species of property, which cannot be disputed to receive equal benefit from its protection. It is oppressive and insufferable, because it takes away from the ingenuity, the exertion, and the capital, which have been super-employed to raise a very valuable commodity over and above what the soil in a state of moderate cultivation could or would have produced. It is injurious to the morals of the people, because it sets them at variance with the ministers of the Gospel : some it drives from the church to the sectaries, and others to the alehouse ; every man therefore is driven in some way or other to devise means to avoid the payment of the tithe, and oftentimes to destroy, but always to lessen the value of that property which by law belongs to another. It is unjust and insufficient to the parson, because in a fit of madness the greater part of the corn lands may be laid down to grass, as in the case of the parish of Buckland, to the serious diminution of his revenue, and because in a very large parish he cannot take his tithe in kind if he thinks his composition has been too small (and the parish agree not to give him more, and which will at once set him at variance with it, let his moral character be what it may) but at a certainty of a very great loss, in spite of all his exertions, or his threats. They will take care by a previous understanding to

give him notice that at such a time his tithe will be set out; this will be as late in the afternoon as possible (and it is not lawful to enter any man's ground before you have received notice) he cannot be with his teams in every man's farm at the hour which they have appointed, some will carry the corn before he gets there, and he must in that case put up with what they may chuse to leave behind, as his tithe, whether it be fair in quantity or not; some will make small sheaves and take care to leave the smallest, which is so placed that it may fall into the furrow, that if it comes wet it may get well soaked; others will have all the women and children in the field to glean as soon as the farmer begins to carry, who are instructed to have a pull at the parson's tithe; others will have the tithe beat out in the night; others will have the tithe carried off by wholesale, and pretend to know nothing about it; others will carry it away in the day time to prevent as they please to say its being stolen by night. Some won't let you ride into their premises after, or with the waggon; others won't suffer a waggon to enter that has already got any tithe in the waggon, although it should not exceed a dozen sheaves, and perhaps the whole parish will give you but one notice instead of every day: although I contend that every time they set out the tithe it is a new act, and as such there ought to be a fresh notice, but I do not find that the law is sufficiently clear in that point. Again, every one of your tithing men are to be bought by strong beer, drams, and money, so that in fact it is a compleat and perfect robbery of the parson, from first to last, from the highest magistrate in the parish to the very lowest farmer. But should the

determination to take the tithes in kind arise from any particular pique on the part of the parson, or the impropiator, and be resisted violently on the part of the parish, as was the case at Battersea, and elsewhere, I do not know of a scene more truly deplorable. No language that I can find can paint the consequences in its true colours; it as at once a disgrace to the country that some other method should not be devised to satisfy the admitted claims of so respectable a class of people upon fair, equitable principles, without taking it altogether from the land: it is said, that so great an alteration and innovation of the law of the land might be attended with serious consequences, so it may be said of the consequences of impressing seamen, or the suspension of the Habeas Corpus act, yet we know that both those acts which are admitted to be an infringement on the liberty of the subject, have more than once saved this country; but we have a case in point to support the abolition of tithes, and the adopting of another mode to compensate for the abolition, which is in the case of most of the inclosures throughout the kingdom, where by suspending or altering a part of that law of the land, we have tacitly admitted the injustice and the impropriety of the measure, or else why condescend to make the alteration? As a loss to the community it is incalculable, not only as depressing and damping the spirit of all agricultural pursuits, but by the destruction of so much corn as, but for taking it in kind, would have found its way to the barn; and I think I may fairly calculate that one-sixth of all the resisted tithe in this kingdom is every year destroyed. Hitherto we have spoken of great or rec-

torial tithes, we must say a little of vicarial tithes. In this part of the subject the loss to the vicar is very considerable; unless in the case of hops, he is in general obliged to compound, and is partly under the necessity, if the parish is wide, to accept of so much composition money as either his predecessors used to receive, or as they may please to give him. For a clergyman to turn factor, which he must do if he takes it in kind, and to keep a warehouse for the reception of milk, butter, eggs, poultry, pigs, fruit, vegetables, seeds, roots, saffron, woad, madder, hops, hemp, flax, honey, wax, and turnips, which I understand are now claimed also as small tithes, appears to be contrary to the very essence of religion; we know he must not turn dealer, and yet how the law and the fact are at variance, for if he must take the tithe in kind, he must retail it out or sell it in such a way as he is likely to make the most of it. I say it is contrary to the doctrine of the Gospel, which explicitly says, that we are not to be mindful of the things of the earth but to lay up treasures in Heaven, which puts a negative upon the idea of a clergyman, above all men, from being a dealer in earthly goods.

To prove the evil tendency of taking tithes in kind, the farmers in the parish of Elsted, which is in the sandy part of the county, have of late years taken to growing carrots, and as the soil produces finer and handsomer roots than perhaps any other part of the kingdom, the best and handsomest roots are sent to the London markets, a distance of near 40 miles of land carriage, and the inferior ones are kept for feeding their stock. But the clergyman having last year taken his tithes in kind to the se-



rious injury of the growers, they intended to desist from growing so many, because the expence of growing them is very heavy, and the advantage in particular seasons somewhat precarious.

The parish of Buckland is under a similar predicament; a question of considerable importance was tried at the last quarter sessions at Reigate respecting it, but as I am not acquainted with the issue, I merely mention the circumstance.

In the first part of this subject, I have said that it was of some importance to know for what purposes tithes were, in the first dawning of christianity, established; because by proving that, we shall be better able to shew that any alteration which the legislature may in its wisdom think fit to make, will be no infringement on the principles of our constitution. In the early periods of the establishment of the christian religion in this country we shall perceive that by much the greater part of the revenues of the church were purely eleemosynary, and the distribution of them was entrusted by the pious and charitable laity with great propriety to the clergy residing and discharging the duties of their function in the neighbourhood, and such funds were intended to be divided in the manner following; "the priests themselves may receive the tithes from the people, and record in writing the names of those who give, and divide them in the presence of witnesses according to canonical authority, and let them take the first part compassionately and humbly for the ornament of the church; and distribute the second with their own hands compassionately and humbly, for the use of the poor and the strangers; the third part the priests

may reserve for themselves." This passage is recorded in the canons of the church in the reign of Henry I. Whoever will be at the trouble of referring to Dugdale's Monasticon, and Selden on tithes, will find the particulars of which the following extracts are only the outline. There were some ordinances collected about the time of King Athelstane, in which is a chapter *de divisione decimarum*, confirming the declaration above quoted. At another period upon an application being made to pope Gregory respecting bishops, the pope answered, "that the custom is generally to make a quadripartite division, for the bishop, for the clergy, for the poor, and for reparation of churches." The 15th statute of Richard II. chapter the sixth, recites "that the diocesan of every parish church, upon the appropriation of such churches, shall ordain, according to the value of such churches, a convenient sum of money to be paid and distributed yearly of the fruit and profits of the said churches, to the poor parishioners of the said churches, in aid of their living and sustenance for ever, and also that the vicar be well and sufficiently endowed." This statute appears to be confirmed by the 4th of Henry IV. chap. 13, almost all the endowments mentioned in Dugdale are declared to be for charitable purposes, and Blackstone in his Commentaries, book 1. chap. xi. thus says: "At the first establishment of parochial clergy, the tithes of the parish were distributed in a fourfold division; one for the use of the bishop, another for maintaining the fabric of the church, a third for the poor, and a fourth to provide for the incumbent when the sees of the bishop became otherwise amply endowed, they

“were prohibited from demanding their usual share, and the division was in three parts only; and hence it was inferred by the monasteries, that a small part was sufficient for the officiating priest, and that the rest might well be applied to the use of their own fraternities (the endowment of which was construed to be a work of the most exalted piety) subject to the burthen of repairing the church and providing for its constant supply.”

We find the monasteries continuing and prosecuting their claims, and by begging and other means eventually buying and getting into their hands all the advowsons within their reach; we find also that the revenues of the church, which were appropriated or rather destined for the relief of the infirm, the aged, and the impotent, were adequate to the purposes of the design; it also appears that the legislature were very jealous lest the monasteries should attempt to appropriate the great tithes to themselves, and thereby divert the application of the one third which belonged to the poor from the letter of the law: but as in those days, the chancellors were always selected or chosen from among the members of the church, and although the lord chancellor of Great Britain was the legal guardian of every charitable estate in the kingdom, yet as the poor had no mode by which they could sue for a redress of any improper appropriation, or unjust detention of their portion of the tithe, we need not wonder if, ultimately, the whole became diverted into another channel, and that the poor lost their right in consequence of this misfortune. And so it really did turn out, for we see them submitting to

the encroachment and to the loss, without any attempts at recovery, at least none that I have been able to trace upon record. When Henry VIII. dissolved the monastic profession, and transferred their estates and rights to the crown, by which capital stroke of despotic authority he became possessed of revenues amounting to no less a sum than £135,000 a year, it is probable that the clergy and the crown assumed the right of retaining the whole amount of the tithe, without supporting and maintaining either the church or the poor, according to the true intent and meaning of the original institution. But whether it really was so or not, the position is still as well founded, that the legislature may and can, without any violation of the spirit of the constitution, so modify the law of tithes as to make every man pay his relative proportion, agreeably to his rank in life; or rather agreeably to his property; and thus this system, so injurious to a most useful class of people, and consequently detrimental to all, would be no longer oppressive to any particular class more than to another, and thereby be more palatable to all parties.

In looking into a well written pamphlet on the subject of tithes, which defends them on principles of equity, there are a few circumstances which I cannot pass over without taking notice of them in this place. It is well observed by the author that by the statute of 21st Henry VIII. chap. 13, severe penalties are inflicted on every clergyman who shall engage in any secular business, and at ordination a solemn renunciation of all worldly employments is imposed upon them. Is this statute become so obsolete as to be a mere dead letter? And is this

ceremony of ordination a mere form without meaning? If it is not, how comes it that we find clergymen in every part of the kingdom, in Surrey, in Sussex, in Hertfordshire, Buckinghamshire, and Worcestershire, taking upon themselves the office of land stewards, and engaging thereby in secular employments of considerable extent, which necessarily require a great deal of active service? Justice and equity demand that their income should be proportionate to their rank and habits of life; but that provision ought to arise from the church, or from the education of youth which is completely within the spirit of the Gospel. There cannot be a question about the right of tithes in the manner I have stated them, it being a provision established by the legislature. The right does not therefore depend upon the propriety of the appointment, but upon the competency of the legislature to appoint. It is also equally true, that when a man buys an estate, or takes a farm, he does both with the knowledge that the estate is subject to the condition of the payment of the tenth part of the produce to the clergy as tithe: but although justice requires that the condition should be performed, yet it does not remove the extreme hardship of the case, that land only should be made chargeable with this condition, while manufacturers and the monied interest pay nothing to its support. It is equally severe that a man who, with extraordinary exertion and talents, employs a large increase of capital, shall be compelled to pay the tenth part of the produce of such capital, exertion and talents, while he, who does not choose either to exert himself or to make use of any extraordinary capital,

is paying no more than his usual tenths, whereas the other may be paying upon the same quantity of land perhaps a sum or value equal to two or three tenths. If this is the fact, I would then ask if it does not tend to prevent all spirited improvements in husbandry? If the farmer is successful by his exertions the improprator takes advantage of it; if he fails does the improprator make up his loss? If tithes can be established to be a consideration as a rent for the exclusive privilege of cultivating and reaping on certain lands, the farmer has no right to complain, but that case is not synonymous, it will not apply here: the farmer under a lease of 21 years, upon the face of that security, enters upon his improvements, and let his profits be what they may during that period, the landlord does not receive one shilling more advantage; whereas the paying of one tenth of the produce for the privilege of cultivating the ground is, in fact, taking an advantage which a landlord and the owner of the soil cannot do; it is inconsistent therefore with justice. It is in consequence evident that the land under a state of high cultivation cannot allow so large a proportion of its produce to be given to the clergy: for so great is the speculation that there will not remain sufficient extra profit in this case to compensate them for the extra risk. Wherever therefore tithes are taken in kind upon all improvements, there is an immediate falling off of exertion in those parishes; and those farmers, I maintain and can easily prove, are every where to a certain extent impoverished. But admitting that a farmer by a course of good husbandry very much improves the farm, it is often no advantage to him, if he is obliged to

leave it; because it is almost uniformly the custom to prevent farmers from selling their leases. But is it, I again say, fair, that the clergy should take advantage of improvements from which the landlord can derive none? certainly not. With respect to that rule of law which is generally quoted by the clergy, viz. *malus usus abolendus est*; I answer, if it is right that an unreasonable custom should be abolished, the same will apply to the law itself, which the Legislature is every day admitting to be unreasonable and inimical to the improvements of the state.

POOR.

*Their management, and their claims on society considered.*

I find it necessary, in taking a view of this subject, to separate the class of labourers in husbandry from those whom at present I mean to consider as the poor, and who compose no small portion of society. I am led to make this distinction, because it is an admitted fact, that there are fewer paupers among those employed in agriculture than in any branch of our manufactures, or commerce. It will be necessary to bear in mind this circumstance, that when I speak of the labouring poor, or the labourer, I do not mean the labourer in husbandry; who will be treated of separately.

The labouring poor, as well as the impotent, the aged, and infirm, have been in a progressive state of increase, to a very alarming degree, for several years in this county, but within the last four or five years it has exceeded all credibility. I have in the course of this survey endeavoured

very earnestly to ascertain the number of poor that have received alms within and without their respective workhouses in each parish, during the last four years; I have also endeavoured to obtain the total amount of the money, actually raised and levied, in each year, and applied to their support and relief: but I am concerned to say, that although my endeavours have been warmly seconded by the interposition of several gentlemen, in most of the parishes, the attempt has not succeeded; and therefore I am unable to state what perhaps would otherwise have made a strong impression upon the minds of the landed proprietors of the county. They will however see, that although I could not learn the amount of the money raised, I have been able to ascertain that the average assessments per annum, for the last four years, amount within a fraction to the enormous sum of eight shillings in the pound, upon the rack rent: add then the land tax, the church rate, the highway rate, and the tithe, and see how much remains for the landlord and the tenant. When I mention the county, I necessarily include all the parishes within the Borough of Southwark.

Let us coolly consider the cause of this alarming circumstance, and by probing the wound, endeavour to find out a cure. The task is arduous, and difficult, but it is not impossible, nor impracticable: and although we do not pretend to propose any system, we may, notwithstanding, probably offer some useful hints, and be the instrument of bringing the matter again before the legislature, from whose wisdom so much may be expected.

According to Spratt's definition of the word



poor, we are led to understand that it means those who are in the lowest rank of the community, and who cannot subsist but by the charity of others. In this number are necessarily to be placed, the aged, the blind, the lame, the fatherless and motherless, persons labouring under sickness, or who are idiots, lunatics, &c. for all these the overseers of the poor are obliged to provide. There is also another kind of poor, on account of casualties and misfortunes, as decayed housekeepers, and those who have been ruined by fire, water, robbery, or losses in trade, &c. There are likewise those who are overcharged, disabled labourers, &c. As for vagabonds, strumpets, and other worthless sorts of poor, they ought to be sent to the house of correction and not to the workhouse; yet if they be sick while there, or the work should fall short for them, it would seem but reasonable that an allowance should be made by the overseers for their support; provided they are actually not in a capacity to earn sufficient for themselves; but that allowance should be positively limited and restricted to a bare existence, that they may not be induced to pretend illness as an excuse for idleness, and also as a check upon the heedless prodigality of an overseer. Having said thus much by way of introduction, let us examine the cause of the vast increase of the poor in this county, and I am afraid the same cause or something nearly similar prevails in almost every other throughout the kingdom. In the first place, every human being in this country, whatever may be his humble lot, is possessed of the same real necessities (for imaginary ones are out of the question) with those whose sphere is so much

above them; they require food, cloathing, lodging, and fire, and this nearly every day; without these, they cannot go through a life of labour, which in some cases is of the most toilsome kind. The produce of this labour is perhaps to be divided with a wife and several children, who all require to be supplied with those necessaries which I have just enumerated. While the labourer's health and strength are in vigour, he has no occasion for any of those calls upon the humanity of his country, which is sure to be attended with instant relief; but should either of these fail, before he has been able, by frugality, to provide against it, the source of his support is annihilated, and he becomes a suppliant for that assistance which he is unable now to provide for himself and his family. If such a man has been a sober industrious character, charity, and all the best feelings of human nature, come in aid of the propriety of granting to such a man a sufficient allowance for the necessary support of himself and family; but a distinction, in a moral sense, ought absolutely to be made between him and the labourer who, by a continuation of vicious habits, of idleness, and dissipation, has brought the calamity upon himself. In a country like this, even such a man should not starve; but his food and his raiment should be characteristic of his conduct; and I am of opinion, that such a distinction would tend more to preserve the mind of such a man from the charms of continued intoxication, and bad habits, than any sort of corporal punishment whatever. Our ancestors were so fully sensible of making such distinctions, and of not giving relief to those who were able to

work, that we find the legislature in the year 1549, making use of the following strong language: "That no one, under pain of imprisonment by "pretence of piety, or charity, should presume to "give any thing to those who were able to labour; "to encourage them to idleness and sloth, that by "those means they might be compelled to work for "the necessaries of life." In the reign of Henry VIII. a law passed, that every vagabond should be whipt and sent to the place where he was born or last dwelled for three years, there to get his living; if he continued in the practice of idleness, he was to have part of the gristle of his right ear cut off, and if afterwards he persisted in the same bad course of life, he was to be adjudged and executed as a felon. Children under 14 years of age, and above five, that live in idleness, and are found begging, might be put to service either to crafts or husbandry. This same statute was confirmed by Elizabeth, with this difference, that if the vagabond was above 14 years of age, and was willing to alter his course of life, and could procure any creditable person to employ him for a year, he was to be pardoned, or rather the punishment of grievously whipping and burning through the gristle of the ear for the first offence, was to be suspended; but a return to his former evil courses, made him subject to the penalty of death, (although the former sentence had not been executed) unless some creditable person would take him for two years. And if he falls a third time into a roguish life he shall be adjudged a felon. Now the necessity for these statutes could arise only from a desire to remove a growing and very alarming evil, by endea-

vouring to encourage industry, and by punishing idleness. But so great is the temptation and lure held out by the present management of the work-houses, so certain the relief to be granted by the parish officers, either by the orders of a magistrate, or according to their own inclinations; that every barrier against idleness and drunkenness is without restraint laid aside. Possessing therefore such ready means of securing a subsistence without having recourse to more desperate measures, though they do not perhaps commit them themselves, they too often bring up their children in those destructive habits.

Who can live in the country, or go into the country, without daily seeing gangs, if I may so call them, of children from the age of six to 16 sent out to beg and plunder? This is the daily occupation of the younger branches of the poor, who are as regularly initiated in the practice of it, as if it were a profession, by which they were to acquire their future livelihood; and this too by the iniquity of those very parents, who ought to have inculcated this sacred injunction on their tender minds, "Thou shalt not steal." There is nothing, however, which falls within their grasp, that, sooner or later does not become a prey to their predatory system. The pales are loosened from their rails or broke off; the gates, stiles, and bars, are cut and mangled; the boughs of the trees whether timber or pollards are hacked and separated from their trunks; the live and dead hedges are torn asunder, and all are in their turn, carried away. Whatever cannot be done by the children is easily done by the parents; even the very growing crops

do not escape the violence of their plunder. As soon as the turnips are fit to draw, after escaping one or two sorts of insects, they are attacked by those of a larger growth, I mean the children; the potatoes, cabbages, pease, beans, wheat, and barley, all are subject to the same peculation: and although the mere taking a few of those articles at a time may be of no considerable value, yet repeated, and multiplied daily by hundreds and thousands throughout the kingdom, I would ask, does not the loss amount to several acres? These are a total loss which cannot be replaced, but the gates, the stiles, the bars, pales, and fences, must all be repaired and replaced immediately; and is that done without any expence? Upon a large farm we know it is a serious thing; besides the danger of losing the cattle, owing to the gaps that are made thereby. If such be the case in the interior of the country, and further removed from the contaminations of a large town, what must not be the situation of those farms in the environs of such places as Croydon, Kingston, Reigate, Dorking, or Guildford, to say nothing of such places as Peckham, Camberwell, Battersea, Wandsworth, Putney, Merton, and Lambeth, &c. where the population of this class of people is immense; and the aggregate of the injury will exceed all calculation. It is no unusual thing to see half an acre of wheat in one field entirely stripped, and although I have known children caught in the fact, and taken before a magistrate, yet as it could not be proved that their parents were privy to the transaction, the magistrate could only reprimand and admonish them, for they were too young to be personally amenable. But

did the farmer lose the less, or were fewer depredations committed on his property? no. It only made them somewhat more circumspect in their proceedings, so as to prevent the farmer from being able to swear to his property. Did this system end here, happy would it be for thousands, but that is seldom the case; by habit they are led to consider all these articles as of no value, and that custom has sanctioned their right to them. From small beginnings great consequences often follow; the undisturbed right to the turnip gives them a licence to the apple, from the apple to the egg, and from the egg to the chicken; thus the articles of villainy increase with their age, until they become hardened adepts in the science; and consequently fit and ripe for every species of villainy. What is the cause of all this misery? it cannot be the want of employment, for as Defoe said in his letter to Parliament, "There is more labour than hands to perform it, and consequently a want of people not of employment. No man in England of sound limbs and senses can be poor, merely from want of work; all our workhouses, charities, &c. for employing the poor, are public nuisances, of mischievous tendency to the nation, increase the number of poor, and serve to the ruin of many families. It is a regulation of the poor that is wanted, and not setting them to work; the labouring poor eat and drink, but especially drink, three times as much as foreigners. The number of poor is occasioned by those who will not work, not by those who can get no work, but if alms are to be given, let it be to those only to whom death or sickness have made it necessary; for alms ill directed may be charity to

a particular person, but becomes a serious injury to the public."

What says Count Rumford upon the subject? a man who has devoted so much time, and taken such indefatigable pains in the cause of the poor, cannot but be listened to with great attention. "The children of beggars are regularly trained up to the profession of their parents, and having the advantage of an early education, are commonly great proficient in their trade. As there is no essential difference between depriving a person of his property by stealth, and extorting it from him against his will by dint of clamorous importunity, or under false pretence of feigned distress or misfortune; so the transition from begging to stealing, is not only easy but perfectly natural. That total insensibility to shame, and all these other qualifications which are necessary in the profession of a beggar, are likewise essential to form an accomplished thief, and both these professions derive very considerable advantage from their union. A beggar who goes about from house to house to ask for alms, has many opportunities to steal, which another would not easily find; and his profession as a beggar, gives him a great facility in disposing of what he steals; for he can always say, it was given him in charity. No wonder that thieving and robbing should be prevalent where beggars are numerous. Whatever sums of money or other assistance, given to the poor in alms, do not tend to make them industrious, never can fail to have a contrary tendency, and to operate as an encouragement to idleness and immorality; and as the merit of an action is to be determined by the good it produces,

the ability of a nation ought not to be estimated by the millions which are paid in poor's taxes, but by the pains which are taken to see that the sums are properly raised and applied. It has often been said, that the poor are vicious and profligate, and that therefore nothing but force will answer to make them obedient, and keep them in order; but, I should say, that because the poor are vicious and profligate, it is so much the more necessary to avoid the appearance of force in the management of them to prevent their becoming rebellious and incorrigible. How much prudence and caution are necessary in dispensing rewards and punishments? and yet how little attention is in general paid to those important transactions? Rewards and punishments are the only means by which mankind can be controlled and directed; and yet, how often do we see them dispensed in the most careless, most imprudent, and most improper manner? How often are they confounded, how often misapplied? To the improper use of them may be attributed all the disorders of civil society, to the improper and careless use of them, may most unquestionably be attributed the prevalence of poverty, misery, and mendicancy of the poor in most countries, and particularly in Great Britain, where the healthfulness and mildness of the climate, the fertility of the soil, the abundance of fuel, the numerous and the flourishing manufactures, the extensive commerce, and the millions of waste lands which still remain to be cultivated, furnish the means of giving useful employment to all its inhabitants, and even to a much more numerous population. But instead of encouraging the laudable exertions of useful in-



dustry, and assisting and relieving the unfortunate and infirm, (the only real objects of charity,) the means designed for those purposes are so misapplied as to operate as rewards to idleness and immorality; the greater the sums are which are levied on the rich for the relief of the poor, the more numerous will that class become, and the greater will be their profligacy, their shameless and clamorous impertunity."

"If the cause of this evil," says the great Mr. Locke, "be looked into, we humbly conceive it will be found to have proceeded, not from the want of employment for the poor, nor from scarcity of provisions, for God has blessed these times with plenty. The growth of the poor must therefore have some other cause, and it can be nothing else but the relaxation of discipline and corruption; virtue and industry being as constant companions on the one side, as vice and idleness on the other."

Guthrie sees the subject in a very important light. "The over sensibility of the English," he says, "is discovered in nothing more than in the vast subscriptions which are annually raised by all degrees of both sexes. An Englishman feels all the pains which a fellow-creature suffers, and poor and miserable objects are relieved in England, with a liberality which some time or other may prove injurious to industry and to society, because it takes from the lower ranks the usual incentives of labour, that they may save somewhat for themselves and families against the days of sickness and pain. The very people who contribute to those subscriptions, are assessed in proportion to their property for their parochial poor, who have a legal

demand for a maintenance; and upwards of three millions sterling is said to be collected yearly in this country for charitable purposes; yet notwithstanding all those noble provisions which would banish poverty from any other country, the streets of London and the highways of England, abound with objects of distress, who beg in defiance of the laws, which render the practice severely punishable. This is owing partly to the manner in which the common people live, who consider that food to be not eatable which in any other country would be thought luxurious."

Adam Smith was not insensible of the state of this class of people when he wrote the following: "Men may live together in society with some tolerable degree of security, though there is no civil magistrate to protect them from the injustice of such passions, as envy, hatred, and resentment. But avarice and ambition in the rich, in the poor the hatred of labour, and love of present ease and enjoyment, are the passions which prompt to invade property, passions much more steady in their operation, and much more universal in their influence. Wherever there is great property, there is great inequality. The affluence of the rich excites the indignation of the poor, who are often both driven by want and prompted by envy to invade his possessions; it is only under the shelter of the civil magistrate that the owner of that valuable property, which is acquired by the labour of many years, and of many successive generations, can sleep a single night in security. He is at all times surrounded by unknown enemies, whom, though he never provoked, he can never appease, and from

whose injustice he can be protected only by the powerful arm of the civil magistrate, continually held up to chastise it." If we need further proofs, the language of that very able magistrate, the late Mr. Henry Fielding assists us. "It is matter of astonishment," says he, "to any man to reflect, that in a country where the poor are, beyond all comparison, more liberally provided for than in any other part of the world, there should be found more beggars, more miserable distressed objects, than are to be seen through all the states of Europe. The poor are not only a great burthen, but they are even a nuisance to the kingdom; that the laws for relieving their distresses and restraining their vices have not answered their purposes; and at present that they are very ill provided for, and worse governed, are truths which every man will acknowledge; and every man who hath any property must feel the weight of that tax which is levied for the use of the poor, and every person who has any understanding, must see how absurdly it is applied. So very useless is this heavy tax, and so wretched its disposition, that it is a question whether the poor or the rich are actually more dissatisfied, or have indeed greater reason to be so, since the plunder of the one serves so little to the real advantage of the other. The sufferings of the poor are indeed less known than their misdeeds, and therefore we are less apt to pity them! They starve, and freeze and rot among themselves; but they beg and steal and rob among their betters." "If a sturdy beggar comes to your door begging, and you offer to set him to work, will he accept it? no: then if you give him nothing, you run the risk

of personal abuse, but if you attempt to remonstrate upon the evil tendency of idleness, or upon his course of life, it is a great chance if you do not receive something worse than abuse, either immediately or at some other opportunity. Now the cause of this vast accumulation of poor, appears to me, to proceed from these circumstances, viz. the great increase and continued multiplication of alehouses, to the prevalence of smuggling, of which all these inferior alehouses are a great support, to the number of pop-shops, which lie in the beat of the smuggler, of which the number is inconceivable in this county, as well as Kent, and Sussex, and Hants, and in a great degree to that extreme facility with which the poor are able to obtain relief (no matter what their characters are) from the overseers of the parish either in which they live, and have a legal settlement, or wherever they can impose themselves.

Whoever will give himself the trouble of looking into the history of this country will find, that no sooner did the clamorous situation of the poor, and the growing profligacy of the lower orders of the people claim the attention of the Legislature, than they found themselves under the necessity of going to the root of the evil; to have done otherwise would have been doing the business by halves. In tracing the source of this calamitous evil, they readily found it in those sinks of vice, the inferior alehouses. As they found it necessary from time to time to repress the licentiousness of the vagabond, they were obliged as often to regulate the conduct of the alehouse. Can any thing speak more strongly the ideas of Parliament than the

measures which they found it necessary to pursue against both? and which they did pursue. Let any man go into one of the best of those houses on a Saturday night, after the labourer has received his weekly pay, and he will be soon a witness of a scene of drunkenness and blasphemy that is sufficient to appal his senses, and which, if the publican attempts to repress, he may at once perhaps as well shut up his house. If the best, therefore, are obliged to a certain extent, to submit to such scenes, what may not be expected from men of immoral characters, and who are determined to put up with every thing; indeed we know that they do encourage every species of riot and licentiousness, in order that they may the more easily plunder such miserable infatuated wretches. The first notice we have of licensed alehouses is in the 5th and 6th of Edward VI. according to Burn, and the preamble runs thus: "For as much as intolerable hurts and troubles to the common wealth of this realm doth daily grow and increase, through such abuses and disorders as are had in common alehouses, and other houses called tipling-houses, be it enacted, &c." For what purpose could this preamble be introduced to a bill, which was intended to sanction by law that which was stated in the preamble to be attended with intolerable hurts and troubles to the commonwealth. And in fact, abuses and disorders increased so alarmingly that Elizabeth, in the 39th year of her reign, passed an act wherein the use of alehouses is stated, and the abuses of them became punishable. The preamble to this act says: "Whereas the ancient, true, and principal use of inns, alehouses, and vic-

"tolling-houses, was for the receipt, relief, and  
 "lodging, of way-faring people, travelling from  
 "place to place, and for such supply of the wants  
 "of the people as are not able, by greater quan-  
 "tities, to make their provision of victuals, and  
 "not meant for entertainment, and harbouring of  
 "lewd and idle people to spend and consume their  
 "money and their time in a lewd and drunken man-  
 "ner; be it enacted, &c." This act, therefore,  
 punishes the landlord of such houses for permitting  
 excess of drinking; and there is another act, which  
 punishes the drunkard and the tipler also; but not-  
 withstanding these statutes continue at this day to  
 be the law of the land, and are admirably calculated  
 to prevent these scenes of drunkenness, as the cause  
 of more serious evils; yet, it is melancholy to re-  
 flect, that they are often no more attended to than  
 if no such laws had ever been in existence. It is  
 therefore to this relaxation of discipline on the part  
 of the magistrates, and to the immense increase of  
 those houses all over the kingdom that may, to a  
 certain degree, be attributed that degeneracy and  
 poverty which we daily see, and which we have so  
 much reason to deplore. This brings me to the  
 subject of relief. When a man is encouraged by  
 great wages, a constant habitude for tippling, and a  
 knowledge that hereafter the parish must maintain  
 both himself and family when his race is run, and  
 the facility with which he can obtain this reward  
 for his improvident conduct, every restraint is at  
 once removed from the mind of such a man; and  
 he is induced by this prospect to continue in his  
 career at the expense of his constitution, re-  
 gardless of every claim upon his industry and fru-

gality by an impotent offspring. If such a man is however cut off in the prime of life, and a helpless family left behind to lament his depravity and their own misfortunes, he knows that they stand a chance of being better taken care of than when he himself was alive. For this noble establishment we are indebted to Queen Elizabeth; she had no sooner established our religion upon its present foundation, but she set about regulating the affairs of the poor in such a manner as proved incontestibly that she had taken up the subject with a resolution to render their situations more determinate and settled. In the fifth year of her reign she established many useful regulations as to the hours of work, the reciprocal conduct between masters and servants, the wages of servants, labourers, and artificers, as well by the day as by the year, and these were to be adjusted by the magistrates of the county; who were to have regard to the price of grain, &c. as a standard for their government; at whatever rate these wages were settled by them, there was a penalty inflicted on the masters for giving, and the servant for taking, more than such wages; indeed a penalty also attaches on the justices, if they do not attend properly from time to time, to put the provisions of the act into execution; this act is the present law of the land with little alteration. About the 14th year of her reign, assessments were directed to be made of the parishioners of every parish, for the relief of the poor of the same parish, and for prisoners in common gaols; about the same time an act was passed, fixing the maintenance of natural children, which is also the present law of the land.

A stock of flax, hemp, &c. was in the same Parliament ordered to be provided for setting the poor to work: houses of industry and workhouses were permitted to be erected, in which this stock was to be kept, and in which the poor were to be employed; the churchwardens and overseers were empowered to raise money by assessments, and to carry these and other regulations therein mentioned into execution. The justices of the peace were to appoint these officers yearly, and to superintend their management and conduct. As a great deal of power thus became invested in the hands of churchwardens, overseers, and magistrates, the law provided amongst a great many other salutary provisions, that if any person felt himself aggrieved, in any way, by these officers, he might appeal to the quarter sessions for relief. Had this statute of Elizabeth been upon all occasions fully and unequivocally acted upon, there is no question at all but there would at this time have been fewer poor all over the kingdom; the class of people next above them would have been more comfortable and happy, and the present enormous burthen of the poor's rates would have been a mere nothing. But, as Judge Blackstone said, the farther any subsequent plans for maintaining the poor have departed from this institution, the more impracticable and even pernicious their attempts have proved. Has he not prophesied right? Has not the amount of the rates increased within the last 50 years, from little more than one million sterling per annum to upwards of four millions per annum? and how is this to be accounted for? unless it is, that more poor receive relief; that those who are kept in the



workhouses are not properly employed; that profusion and extravagance in their maintenance takes place of frugality and economy; and that large sums are annually squandered in eating and drinking, and other unnecessary and illegal expenditures. It is a well known fact that most parishes are managed by a *junto*; these men being once in office take care to supply their places with people of their own stamp; the butcher in office, contracts with his friend the retail shopkeeper to supply the poor with cloathing and grocery, with his shoemaker for their shoes, and when he is out of office they employ him in return; all this is daily done at an average of 20 to 30 per cent. beyond the prime cost; when by employing those children who are now running about in idleness and mischief, as they are employed at the Philanthropic Reform, in St. George's Fields, they might make every article of cloathing not only much cheaper, but much warmer and stronger, and that would wear in consequence much longer than any that is usually bought at the shops. To this immense saving and advantage, another would be added, of a much more flattering nature, in the habit of industry, which would imperceptibly as it were grow up, in the minds of those children; who now most lamentably are for the most part a pest to society, and a serious loss to the community. I have just now said that most parishes are led by a *junto*, who regulate all its proceedings, and set all moderate opposition to their plans at defiance. That which is the necessary business of every parishioner who pays to the rates is unfortunately the business of but few; we suffer an immense revenue to be

levied upon us for two very laudable purposes, to relieve distress, and to encourage industry; and because those who from education and rank in life do not choose to give themselves the trouble of seeing to the disposal of this vast revenue, we suffer a great part, equal perhaps to one half of it, to be perverted and disposed of in the most profuse and shameful manner; which honestly and fairly applied to the purposes of this act of Elizabeth, the poor would be more decently and respectably maintained, and the other half would necessarily remain in the pockets of those from whom the whole is now with so much rigour, and often cruelty, exacted.\*

Having given this subject a great deal of consideration, and having endeavoured to collect the sense of many very high characters in the county; a notion seems very prevalent, that it is more advantageous to employ the poor in various branches of manufacture at their own houses, than in places of more public reception, either as workhouses, houses of industry, &c. If they are people that can be trusted, I think the matter will admit of no doubt; this is

\* A frugal administration of the public treasure is one sign of a well governed state: which can never be well governed when the public treasure is ill administered. When the public money is not applied as it was intended, what security can a people have that any other part of the government will be administered as they intended it should?

That memorable saying of Gracchus in the better times of that great state (Rome) was highly honourable to him as a man and a courtier. He had been a great minister and governor of Sardinia, and could say for himself when he left it; "*Zonas quas plenas argenti extuli, eas ex provincia manes retuli.*" I spent my own money in my own employment, and the coffers which I carried full thither, I brought empty back.

not the opinion of Count Rumford, from whom I dissent with great deference ; for it is but too true, that crowded workhouses, as they are constructed and conducted, in which are assembled the good and the bad, the old and the young, the healthy and unhealthy, are introductory of the most serious evils. If they are assembled in one room at work, their health, and not less their morals, are sure to be contaminated ; the most horrid and depraved language is constantly assailing the ears of the honest, the young, and weak minds, and with such examples eternally before them, they must almost be something more than human, if they escape the contagion. If they are sober and honest they will do more work at home than in any public institution whatever ; and though they should earn less, yet as it is well known that seven or eight shillings at home will go as far as 18 or 20 shillings in the workhouse ; there is every reason why the former mode should be preferred to the latter. But again, if the poor should at their own houses not earn so much as they may require to support their families, is it not much better to find them work, and pay them for what they do, than pay them for living in idleness ? For we all know that while people live in idleness, they will be spending, if they have it, or can get it, no matter how. It is not the present profit that is so material, the great object appears to me, to keep the poor constantly employed, to inure them, and to engraft into them, principles of industry, thereby preventing those disgraceful practices, begging and starving. Was this plan acted upon uniformly, we should get rid of the thousands of applications for relief from the parent,

because he has six or seven children ; when, if the matter was closely scrutinized, it would perhaps be found that he has several of them capable of earning a great part of their living, instead of going out daily to pilfer and plunder ; let us look back to the parish accounts for the last half century, of any large parish within the county, and I think I may say that the expence of the poor's maintenance has advanced within that period from forty or fifty shillings per annum to twenty pounds, their wages have increased from one third to one half as much as it was then, and provisions upon the average of fifty years have increased comparatively but in a small degree. It may then well appear paradoxical to our neighbours the French, and those who have but a superficial knowledge of the subject, that while millions sterling are raised and expended for the express purpose of affording relief to the necessitous poor, there are millions still who stand in need of more relief than they receive ; this arises, partly, from a want of prudence among themselves, and partly from the consideration, that many of those who do receive relief are not bona fide parishioners, but are forced upon the parish against the inclination of the officers. Every parish maintains a legal warfare against all the rest of the kingdom, as may be seen by referring to the accounts laid before parliament in the year 1785, when it appeared that the law charges respecting the poor for the last three years for England and Wales, amounted to the incredible sum of £55,791 2s. 6d. and the expences of entertainments for the same period averaged £11,713 ; which two sums united form an aggregate of £67,504 2s. 6d. ; if to these sums be added the

expences of overseers journies, of £24,493 18s. 6d. in attendance on magistrates, we shall have a gross sum of £91,998 1s. 0d. an amount so enormous as to stagger all belief. If such was the amount however eighteen years ago, what has it arisen to upon the average of the last four years? By the rule of three we shall come at the sum of £127,814, nearly, which I dare say is much below the truth. Let me then ask, is such an expenditure not sufficient to arrest the attention of the landed interest? I presume it is: but what will they say, when to this extraordinary amount thus raised by a tax upon houses and land, there is an annual income of £258,710 19s. 3d. or perhaps a great deal more, which is disposed of in charitable contributions, exclusive of the parish poor. Whatever, therefore, tends directly or indirectly to tax land, must occasion an increase of price upon every article of its produce, and must in the end fall upon the consumer. It becomes the serious consideration of every one who wishes well to his family, and his country, to discourage every trait of idleness and dissipation among the lower orders; to watch with a scrutinizing eye the conduct of the parish officers in the disposal of so vast an annual revenue; and so long as the present laws are in force, to systematise every transaction in the management of the poor; and to see that these statutes which are in being are acted upon to the full extent both of the spirit and the letter of them. Had this been uniformly attended to, it is probable that the parish of East Grinstead would have had to pay 20s. 3d. in the pound on a valued assessment; or that the parish of Heathly would have had to pay 27s. in the pound; the pa-

rish of West Grinstead 29s.; and the parish of  
 Billingshurst near 40s. in the pound; besides a  
 great many others which I could name, when their  
 neighbours equally numerous in their poor, in pro-  
 portion to the size of the parish, were not paying  
 the half, one third; and one fourth of those sums;  
 does it reflect any credit upon the parishes that such  
 things should be? And that such things have been  
 within the last three or four years is notorious. Is  
 it right that because a man in business as a shoe-  
 maker, or a tailor, with constant work, and employ-  
 ing two or three people, because these people happen  
 to have a family of five or six children, should upon  
 all occasions resort to their parishes for assistance to  
 enable such men to spend their time and money  
 at an alehouse every night? Do not therefore let  
 us blame the principle of our poor laws as insuf-  
 ficient or ineffective; rather let us blame those  
 whose business it is to put those laws in execu-  
 tion, for suffering such things. Were there no ale-  
 houses, it is probable that these men would have had  
 no occasion to apply to their parishes for relief;  
 but it is unpardonable to grant any to such men,  
 who are both stout and able, in order that they may  
 spend the more money at the alehouse. 'Tis true  
 enough, and falls within the observation of  
 many a man, whose business it is to travel, that  
 many a village can date the commencement of mi-  
 sery and ruin to the poor families of the place to  
 the introduction of an alehouse. It is not as Mr.  
 Rent says in his Hints to Gentlemen of Landed  
 Property, nor as the Rev. Mr. Howlett, or as Sir  
 William Young infers, that the increase of the  
 poor's rates arise from the advance in the value

of the produce of land, in a greater proportion than that of the price of labour; for we know that it has increased from 8s. to 12s. per week, and that many a drunken good workman will earn 20s. a week now, when he was satisfied with 12s. or 14s. per week 15 or 20 years ago. I have for the last 20 years been employed in improvements in every part of the kingdom; and from my own knowledge I can assert, that the price of labour has progressively increased from 7s. to 12s. per week. In the concern in which I was bred, and which I followed until I was 36 years of age, when the number of men employed was never less than 12, and from that to 30, the rise of wages was from 9s. to 12s. and the earnings of a workman by the great, rose in the same period from 14s. to 25s. per week, and the more these latter earned the poorer they were, nearly the whole of it being spent at the public houses; while their families were starving; seldom working on a Monday, and without almost a shoe or cloaths to cover themselves with, while the former upon their 9s. a week lived decently, and were always tidy in the week days, and clean and rather smart on a Sunday: the advance of wages therefore, in this instance, tended to a great deal of mischief. Has the average price of corn, meat, candles, salt, leather, cloth, soap, butter, and cheese, increased in the same proportion? No, in reply to Mr. Godschall's assertion that alehouses had increased in number throughout the kingdom, the Rev. Mr. Howlett appears to doubt the fact: but if doubting the case, would establish the fact that they had not, there would be an end of the business. Only let him enquire, however, at the excise office, and be

would soon be convinced how egregiously he was mistaken; let him inquire of any great brewer either in London or in the country, or of the magistrates, and his scruples would at once be removed; with much good sense he has admitted that he has been wrong in his calculations on the population of the kingdom, and he may now say the same with respect to alehouses. In the county of Surrey there have not been less than 5000 houses built within the last 30 years, and added to the former number, as the greater part of these have been erected within the bills of mortality: I merely state, that it is the calculation of every builder, that a certain number of new houses will support a public house; and therefore according to the scale of building in which such a person may be engaged, or where there may be reason to expect that such a number will at some early period be built, he begins a public house as the first erection. This is an invariable rule, and has increased the number of those nuisances in this county upwards of 50. Now, although in places more distant from the metropolis the mania for building has not made the same rapid increase, with the exception of the manufacturing towns, as to produce such an increase of alehouses; yet no man can be in the habit of travelling the kingdom over, without continually finding some fresh house opened as a public house on the road side; in towns as well as in villages—in some petty villages in Hertfordshire, Bedfordshire, Buckinghamshire, Kent, Sussex, Middlesex, and Surrey, there are often to be seen five or six in a population of 50 or 60 houses, and where the population never seems to have exceeded that number. Can it be possible.

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ble that any necessity whatsoever could have demanded at any period such a number, even admitting the places to be great thoroughfares? At whose door therefore are we to lay the prevalence of these pests to society, but to the tameness and want of exertion on the part of the magistracy? It is little more than ten years since, that in the town of East Grinstead there were no fewer than eleven or twelve public houses, with a population at no one time exceeding one hundred and thirty houses; a place without manufacturies, or any other trade, than what arose in the parish, and with a thoroughfare of very limited extent. The magistrates of the present day, very much to their credit, saw the enormous evil which arose to the morals of the people, and wisely suppressed half of them; but had they gone further, and reduced that number two thirds, instead of one half, it had been infinitely better for the inhabitants; and their families would have had great reason to bless the day on which that deed was done.

There is one very remarkable fact in the circumstance of these institutions, which is, that the greater the number of them is, the poorer are the inhabitants, which I shall presently shew by naming the places. For the present I will only ask of what advantage to the place, to the community, or where is the necessity for so many alehouses, as are to be found at this time, at Barnet, at Colney, at Redbourne, Market Street, Dunstable, Hockliffe, Little Brickhill, Fenny Stratford—at Woburn, Newport Pagnell, Cheshunt, Broxbourne, Hodsdon, Ware, Buntingford—at Chalfont St. Giles, Amersham, Missenden, Wendover, Aylesbury,

Hammersmith—at Turnham Green, Brentford, Hounslow, Colnbrook, Slough, Twickenham, Hampton—at Stratford, Rumford, and Brentwood—at Newington, Vauxhall, Stockwell, Clapham, Wandsworth, Tooting, Putney, Mitcham, Kingston, Esher, Cobham, Ripley, Ewell, Leatherhead, Sutton, Lewisham, Sevenoaks, Foot's Cray, Deptford, Greenwich, Dartford, Rochester, with all the straggling houses between? &c. &c.; not one of these places but could, with the greatest propriety, spare from one half to two thirds of the number of their present alehouses, and there would then remain enough to answer every convenience for which they were originally instituted and licensed. Are these towns and villages the richer for this number of houses? Are the morals of the people there improved by them? If they are, it will serve the cause of humanity by pointing them out; but as these places are notoriously poor, and more or less so only in proportion to the greater or less number of these houses, the inference that follows is, that they are destructive of society, and tend more to the increase of the poor rates than any other circumstance that can be named. In fact, whoever is driven through necessity into one of those little public houses, as I have often been in the course of my avocations, and particularly during the present survey, and obliged to put up with such fare as those houses afford, (and in course have witnessed the passing scenes) need not wonder at their being destructive both to the health and morals of society; and that they are so in spite of all the reasoning to the contrary, and that they make a place poor and increase the rates beyond what they would otherwise be, is noto-

rious. Where there is no temptation the desires of mankind are very narrow and circumscribed; the labourer is satisfied with his condition, with his mode of life, because he sees that other people in the same station are so too; but the moment temptation is thrown in his way, as soon as he has tasted this alluring draught, and enjoyed the pleasures of a society he thinks he likes, his desires increase, and he is no longer the same man, or else he must be different from human nature: if, unfortunately, he happens to live near one of these houses, he goes of an evening for his pint of beer, if he likes his company he drinks two or three pints; a fourth, a fifth, or a sixth part of his day's earnings is thus consumed in a trice; had there been no public house, he had been satisfied to have staid with his family, and drink pure water at home. Is this a true statement or not? If it is, does it not point out indisputably, that the money thus spent would, in all probability, have been laid by to meet any exigency or unexpected casualty that might arise, whether it be from sickness, from increase of family, or from any extraordinary advance in the price of the necessaries of life? Whichever of these happen, therefore, to such a man's family, he must immediately apply to the parish for relief; because his earnings, when in health, be they great or little, where these vicious deductions are made, are not more than sufficient, and sometimes not sufficient, to keep such a man's family from starving when they are all in health.

Let us now examine Sir William Young's observations, on the consolidation of farms, and the increase of enclosures, as the cause of the increase of rates. It is true, that the landed proprietors

have in general, throughout the kingdom, adopted the plan of consolidating their farms, but the inference to be drawn from this consolidation is in direct opposition to his opinion, and is proved by every day's experience. If a gentleman has ten farms from 30 to £60 a year, which bring him in £500 a year; and he lets them afterwards for more rent, to one tenant of good capital, and proportioned experience; it is very seldom indeed the case, that the old farm houses are pulled down; they are in general tenanted by the servants of the farm; these servants are not likely to increase the poor rates; because they find constant employment, and because it is notorious that the labourer in husbandry is the only class of mankind, of the same rank, that brings so few of its individuals upon the parish; but although, it is not the place here, to discuss at full length the policy of large farms, further than as it tends to the question of the poor; yet, it may be proper just to state, that comparing the capitals and the value of the stock, that shall be upon this farm in one man's hands, with the value of those upon the same farm in ten hands, the difference will be as three to five; now every man knows that although the business of this farm may be much simplified from what it was in so many hands, allowing them all to be good farmers, (which is more than is to be expected in the same number together in any part of England by two-thirds,) yet the additional quantity of good stock which such a farmer will keep, and generally does keep, the great difference in the condition which will be found in them, arising from a mode of husbandry which the small farmer

cannot, or could not pursue to advantage; all tend to give an increase of produce, of one-fourth, one-third, and in some crops of nearly one-half, more than the small farmer could; or ever did produce in the article of wheat; for example, I have known three quarters called a very good crop in Buckinghamshire, when grown on a small farm; it is now a large farm, and I have known the same land produce five quarters per acre, for nearly 30 acres successively. If by this consolidation we produce more stock (for in a small farm few or no sheep are kept at all) and more corn, do we not want more hands to manage it? and can we not afford to pay our work-people better? it is in proof that we do in both instances; and therefore are less liable to increase the poor rates. With respect to inclosures, I also differ from Sir William; he has not by any means satisfactorily made out, that the increase of the poor rates arose solely from the inclosure of the commons and wastes in these six parishes, and not from any other adventitious circumstance; which to prove the position he has advanced, ought to have been done; because, I think, I should have had no difficulty at all to have proved that other six parishes, which have been inclosed in the same county, have found their rates decrease, while other parishes that remained uninclosed, have had their rates increased: I do not speak loosely upon this subject, for since I had the honour to be concerned for the Board in preparing the report of that county in the year 1794, no small portion of my business has lain in it, and therefore I can venture to assert, that the cause of the rise in the poor rates, does not proceed from inclo-

sures; on the contrary, I can prove to a demonstration, that Price, and all the other calculators are wrong, for inclosures give a life and spirit to agriculture which it had not before, they cause a great deal of money to be spent on land, on which not one sixpence was spent before; and if there were only labourers enough before to do the business of the parish, it follows that every hundred acres of new inclosures must cut out so much more employment; what would the rates have been if there had been no such additional employment? the parish would necessarily have been in a state of stagnation, it could be only those who lived upon the side of these wastes and commons that could be so much affected by the inclosure, as to apply to the parish for relief. I shall, however, when we come to consider the subject of commons and wastes, be able to shew also that, with very few exceptions, these cottagers live partly by plunder, and with a very small portion of labour; and so long as they refrain from being troublesome to the parish, so that they do nothing very flagrant, their depredations are overlooked and winked at; and therefore the amount of the poor rates before the inclosure, under these circumstances, is not a fair criterion to decide a question of so much importance. Besides, we know that the affairs of husbandry are so stationary that, upon an average, any farm that will find employment for a given number of hands through the whole season in one year, will do the same the next, and the next; unless there are any improvements going forward. Add however one thousand acres of waste into an

order of cultivation, and then prove that this employment will increase the rates.

Dr. Adam Smith supports my reasoning in the following words: "A man must always live by his work, and his wages must at least be sufficient to maintain him; they must even, upon most occasions, be somewhat more; otherwise it would be impossible for him to bring up a family, and the race of such workmen would not last beyond the first generation. Mr. Caution seems, upon this occasion, to suppose that the lowest species of common labourers must every where earn at least double their own maintenance, in order that one with the other, they may be enabled to bring up two children; the labour of the wife, on account of her necessary attendance on the children, being supposed no more than sufficient to provide for herself. But one half the children born, it is computed, die before the age of manhood. The poorest labourers, therefore, according to this account, must one with the other attempt to rear at least four children, in order that two may have an equal chance of living to that age. But the necessary maintenance of four children, it is supposed, may be nearly equal to that of one man. The labour of an able bodied slave, the same author adds, is computed to be worth double his maintenance, and that of the meanest labourer, he thinks, cannot be worth less than that of an able bodied slave. Thus far at least appears certain, that, in order to bring up a family, the labour of the husband and the wife together, must even in the lowest species of common labour,

"be able to earn something more than what is precisely necessary for their own maintenance; but in what proportion, whether in that above-mentioned, or in any other, I shall not take upon me to determine.

"When in any country the demand for those who live by wages, labourers, journeymen, servants of every kind, is continually increasing; when every year furnishes employment for a greater number than had been employed the year before, the workmen have no occasion to combine in order to raise their wages. The scarcity of hands occasions a competition among masters, who bid against one another, in order to get workmen, and thus voluntarily break through the combination of masters not to raise wages.

"The demand for those who live by wages, therefore, necessarily increases with the increase of the revenue and stock of every country, and cannot possibly increase without it. The increase of revenue and stock is the increase of national wealth. The demand for those who live by wages, therefore, naturally increases with the increase of national wealth, and cannot possibly increase without it.

"It is not the actual greatness of national wealth, but its continual increase which occasions a rise in the wages of labour.

"In Great Britain the wages of labour seem in the present times to be evidently more than what is precisely necessary to bring up a family. Lord Chief Justice Hale, who wrote in the time of Charles II. computes the necessary expence of a labourer's family, consisting of six persons, the



“ father and mother, two children, able to do some-  
 “ thing, and two not able, at ten shillings a week,  
 “ or twenty-six pounds a year.

“ In 1668, Mr. Gregory King, whose skill in  
 “ political arithmetic is so much extolled by Dr.  
 “ Davenant, computed the ordinary income of la-  
 “ bourers and out-servants to be fifteen pounds a  
 “ year, to a family which he supposed to consist  
 “ one with another, of three and a half persons;  
 “ both suppose the weekly expence of such families  
 “ to be about twenty-pence a head.

“ Both the pecuniary income and expence of  
 “ such families have increased considerably, since  
 “ that time, through the greater part of the king-  
 “ dom, in some places more, in some less; though  
 “ perhaps scarce any where so much as some ex-  
 “ aggerated accounts of the present wages of la-  
 “ bour have represented them to the public. The  
 “ price of labour, it must be observed, cannot be  
 “ ascertained very accurately any where, different  
 “ prices being often paid at the same place, and for  
 “ the same sort of labour, not only according to  
 “ the different abilities of the workman, but ac-  
 “ cording to the easiness or hardness of the masters.

“ The real recompence of labour, the real quan-  
 “ tity of the necessaries and conveniences of life,  
 “ which it can procure to the labourer, has during  
 “ the course of the present century, increased per-  
 “ haps in a still greater proportion than its money  
 “ price. Not only grain has become somewhat  
 “ cheaper, but many other things from which the  
 “ industrious poor derive an agreeable and whole-  
 “ some variety of food, have become cheaper; po-  
 “ tatoes, for example, do not at present, through

" the greater part of the kingdom, cost half the  
 " price which they used to do 30 or 40 years ago.  
 " The same thing may be said of cabbages, carrots,  
 " turnips, &c. things which were formerly never  
 " raised but by the spade, but which are now com-  
 " monly raised by the plough. All sort of garden  
 " stuff too has become cheaper. The greater part  
 " of the apples, and even of the onions consumed  
 " in Great Britain, were in the last century im-  
 " ported from Flanders. The common complaint  
 " that luxury extends itself even to the lowest ranks  
 " of the people, and that the labouring poor will  
 " not now be contented with the same food, cloath-  
 " ing, and lodging, which satisfied them in former  
 " times, may convince us, that it is not the money  
 " price of labour only, but its real recompence  
 " which has augmented the scarcity of a dear year,  
 " by diminishing the demand for labour, tends to  
 " lower its price, as the high price of provisions  
 " tends to raise it. The plenty of a cheap year, on  
 " the contrary, by increasing the demand tends to  
 " raise the price of labour, as the cheapness of  
 " provisions tends to lower it. In the ordinary va-  
 " riations of the price of provisions, those two  
 " opposite causes seem to counterbalance one an-  
 " other, and which is probably in part the reason,  
 " why the wages of labour are every where so much  
 " more steady and permanent, than the price of  
 " provisions.

" Since the time of Henry VIII. the wealth and  
 " revenue of the country have been continually ad-  
 " vancing; and in the course of their progress,  
 " their pace seems rather to have been gradually  
 " accelerated than retarded. They seem not only

"to have been going on, but to have been going  
 "on faster and faster. The wages of labour have  
 "been continually increasing during the same pe-  
 "riod; and in the greater part of the different  
 "branches of trade and manufactures, the profits  
 "of stock have been diminishing. The property  
 "which every man has in his own labour, as it is  
 "the original foundation of all other property, so  
 "it is the most sacred and inviolable; the patri-  
 "mony of a poor man lies in the strength and dex-  
 "terity of his hands; and to hinder him from em-  
 "ploying this strength and dexterity in what man-  
 "ner he thinks proper without injury to his neigh-  
 "bours, appears to be a plain violation of this  
 "most sacred property.

"In Great Britain, the wages of country labour  
 "approach nearer to those of manufacturing la-  
 "bour, and the profits of stock employed in agri-  
 "culture, to those of trading and manufacturing  
 "stock, than they are said to have done in the last  
 "century, or in the beginning of the present.

"The whole annual produce of the land and la-  
 "bour of every country, or what comes to the  
 "same thing, the whole price of that annual pro-  
 "duce, naturally divides itself into three parts, the  
 "rent of land, the wages of labour, and the profits  
 "of stock, and constitutes a revenue to three dif-  
 "ferent orders of people; to those who live by  
 "wages, and to those who live by profit. These  
 "are the three great original and constituent orders  
 "of every civilized society, from whose revenue  
 "that of every other order is ultimately derived.

"The interest of the first of those three great  
 "orders, it appears from what has been just now

“ said, is strictly and inseparably connected with  
 “ the general interest of the society. Whatever  
 “ either promotes or obstructs the one, necessarily  
 “ promotes or obstructs the other.

“ The interest of those who live by wages, is as  
 “ strictly connected with the interest of the society,  
 “ as those who live by rent.

“ The wages of the labourer are never so high,  
 “ as when the demand for labour is continually  
 “ rising, or when the quantity employed is every  
 “ year increasing considerably. When this real  
 “ wealth of the society becomes stationary, his  
 “ wages are soon reduced to what is barely enough  
 “ to enable him to bring up a family, or to con-  
 “ tinue the race of labourers; when the society  
 “ declines, they fall even below this, the order of  
 “ proprietors may, perhaps, gain more by the  
 “ prosperity of the society than those of labourers,  
 “ but there is no order that suffers so cruelly from  
 “ its decline.

“ Nothing can be more convenient for a poor  
 “ workman than to be able to purchase his sub-  
 “ sistence from day to day, or even from hour to  
 “ hour, as he wants it. He is thereby enabled to  
 “ employ his whole stock as a capital. He is thus  
 “ enabled to furnish work to a greater value, than  
 “ if he laid out all his money at once, and the  
 “ profit which he makes by it in this way, much  
 “ more than compensates the additional price which  
 “ the profit of the retailer imposes upon the goods.

“ It is not the number of alehouses to give the  
 “ most suspicious example which occasions a ge-  
 “ neral disposition to drunkenness among the com-  
 “ mon people; but that disposition, arising from

“other causes, necessarily gives employment to a number of alehouses.”

Note, on this subject I cannot at all agree with the learned doctor, for the reason which I have before adduced.

To conclude.—Whatever tends to offer a prospect of comfort and ease in the days of sickness and in the declining days of life, equal or superior to that which a man might obtain by a course of industrious habits, takes off from that stimulus of exertion in the younger and more healthy periods, and conduces to an increase of those rates which we all have so much reason to deplore. Charity consents to offer an asylum to the aged and infirm, let their former condition of life have been what it may, so that it has been honest; but it is no charity to rob the industrious and sober, the little shop-keeper and the numerous tribe of people of scanty fortune, to support the idle and the profligate; a distinction should be made therefore between such characters, sufficient to hold out a warning to all classes; and not by giving them better fare, and better treatment than those, who are contributing to their support, can afford to give themselves; if you do, it is the sure way to lessen that quantity of valuable appropriate labour, which is in a great degree the source of the riches of the state; and it tends to add such an increase to the rates, as it is difficult to say at what point it may stop. It is a subject well worthy the very serious attention of Parliament; for so long as it remains a paradox, that while the country is growing richer in arts and sciences, and commerce, and the demand for labourers every day increasing, (of which the com-

plaint is universal that there are not enough, ) our poor shall be increasing 100 per cent. distressed, and always dissatisfied, both with their treatment and lot; can it be wondered at, that they should in some instances be severely treated, as was proved to be the case in the parish of South Damerham in Wiltshire, where those whose business it is to superintend their management as overseers, are themselves in straitened circumstances, and not only of a callous and unfeeling mind, but as low bred and illiberal as those whom by law they are compelled to relieve? I think it is not, and hence I would infer, that the speedy interference of Parliament is now become a matter of the most imperious necessity, and ought by no means to be delayed.

From the various and ample returns made to Parliament, Mr. Rose collects, that the money expended on account of the poor in England, in the year 1803, was £4,267,000, a sum much more than double the amount of that expenditure on the average of 1783-4 and 5, and more than treble that of 1776. Besides which, upwards of another million of money was collected by overseers, for church rates, highways, &c.

The total population of England and Wales is, 8,872,980; number of square miles, 55,833; inhabitants in each mile, 152; rental on which the parochial assessment is made, £24,129,134; rental on which the property tax is collected, £33,975,043; the number of poor receiving relief is in the proportion of 12 to each 100 of the population; the number relieved in workhouses is, 83,462, at £12 8s. 6½d. per head per annum; out of work-

houses, 956,248, at £3 3s. 7½d. making the whole number of poor relieved, 1,039,710. The number of members in friendly societies, is 704,350.

#### RURAL LABOURERS.

I have separated the class of rural labourers from those which are usually employed in manufactures and mechanics, under a persuasion that they are a very distinct order of people, arising altogether from the nature of their employment; and therefore, ought in my opinion to be separately considered. This fact I will endeavour to place in a clear point of view.

According to Adam Smith, the produce of labour constitutes the natural recompence or wages of labour. In that original state of things, which precedes both the appropriation of land, and the accumulation of stock, the whole produce of labour belongs to the labourer. He has neither landlord, nor master, to share with him. Had this state continued, the wages of labour would have augmented with all those improvements in its productive powers to which the division of labour gives occasion, all things would gradually have become cheaper; they would have been produced by a smaller quantity of labour; and as the commodities produced by equal quantities of labour, would naturally in this state of things be exchanged for one another, they would have been purchased likewise with the produce of a smaller quantity. But this original state of things, in which the labourer enjoyed the whole produce of his own labour, could not last beyond the first introduction of the appropriation of land, and the accumulation of

~~stock~~. It was at an end, therefore, long before the most considerable improvements were made in the productive powers of labour; and, it would be to no purpose to trace further, what might have been its effects upon the recompence or wages of labour. As soon as land becomes private property, the landlord demands a share of almost all the produce which the labourer can either raise, or collect from it. His rent makes the first deduction from the produce of the labour which is employed upon land. It seldom happens that the person who tills the land has wherewithal to maintain himself till he reaps the harvest. His maintenance is generally advanced to him from the stock of a master, the farmer who employs him, and who would have no interest to employ him, unless he was to share in the produce of his labour, or unless his stock was to be replaced to him with a profit. What are the common wages of labour depends every where upon the contract usually made between the master and the servant, whose interests are by no means the same. The workmen desire to get as much, the masters to give as little, as possible. The former are disposed to combine in order to raise, the latter in order to lower, the wages of labour.

In almost every part of Great Britain there is a distinction even in the lowest species of labour between summer and winter wages; summer wages are always highest. But on account of the extraordinary expence of fuel, the maintenance of a family is most expensive in winter. Wages being therefore highest when this expence is lowest, it seems evident that they are not regulated by what



is necessary for this expence, but by the quantity and supposed value of the work. A labourer, it may be said indeed, ought to save part of his summer wages in order to defray part of his winter expence, and that through the whole year they do not exceed what is necessary to maintain his family; through the whole year the wages of labour do not fluctuate with the price of provisions. This varies every where, from year to year; and frequently from month to month. But in many places the money price of labour remains uniformly the same, sometimes for half a century together. If in these places, therefore, the labourers can maintain their families in dear years, they must be at their ease in times of moderate plenty, and in affluence in those of extraordinary cheapness. The liberal reward of labour therefore, as it is the effect of increasing wealth, so it is the cause of increasing population. To complain of it, is to lament over the necessary effect and cause of the greatest public prosperity. The liberal reward of labour, as it encourages the propagation, so it increases the industry, of the common people. The wages of labour are the encouragement of industry, which, like every other human quality, improves in proportion to the encouragement it receives. A plentiful subsistence, increases the bodily strength of the labourer; and the comfortable hope of bettering his condition, and of ending his days in ease and plenty, animates him to exert that strength to the utmost. The inhabitants of the country dispersed in distant places, cannot easily combine together. They have not only never been incorporated, but the corporation spirit never has prevailed among them. No ap-

prenticeship has ever been thought indispensably necessary to qualify for husbandry, the great trade of the country. After what are called the fine arts, and the liberal professions, however, there is perhaps no trade which requires so great a variety of knowledge and experience. The innumerable volumes that have been written upon it in all languages may satisfy us, that amongst the wisest and most learned nations it has never been regarded as a matter very easily understood. And from all those volumes we shall in vain attempt to collect that knowledge of its various and complicated operations, which is commonly possessed by the common farmer, how contemptuously soever the very contemptible authors of some of them may sometimes affect to speak of him. The direction of operations, besides, which must be varied with every change of the weather, as well as with many other accidents, requires much more judgment and discretion than that of those which are always the same, or very nearly the same. Not only the art of the farmer, the general direction of the operations of husbandry, but many inferior branches of country labour require much more skill and experience than the greater part of mechanic trades. The man who works upon brass and iron, works with instruments, and upon materials of which the temper is always the same, or very nearly the same. But the man, who ploughs the ground with a team of horses or oxen, works with instruments of which the health, strength, and temper, are very different upon different occasions. The condition of the materials which he works upon, is as variable as that of the instruments which he works with, and

both require to be managed with much judgment and discretion. The common ploughman, though generally regarded as the pattern of stupidity and ignorance, is seldom defective in this judgment and discretion. He is less accustomed indeed to social intercourse than the mechanic who lives in a town. His voice and language are more uncouth, and more difficult to be understood by those who are not used to them; his understanding however, being accustomed to consider a greater variety of objects, is generally much superior to that of the other, whose whole attention from morning till night is commonly occupied in performing one or two simple operations. How much the lower ranks of people in the country are really superior to those of the town, is well known to every man whom business or curiosity has led to converse much with both. In Hindostan and China accordingly both the rank and the wages of country labourers are said to be superior to those of the greater part of artificers and manufacturers. Plato must certainly have been mistaken, (or the people of those days were very different from those of the present,) when he said, that the gods deprive those who are destined to servitude of half their understandings, he could never have meant to have included husbandmen, because, as I have just shewn, it seems admitted that they are by no means deficient in common plain understanding; they are among the most hardy race of men, patient of fatigue, and capable of great exertion; but unfortunately, their masters having but little activity themselves, they do not so often require it of their men; hence that slow but uniform pace which is upon all occasions to be found

among them, let the necessity for exertion be what it may. I am sorry to find a want of that attachment among the rural labourers which formerly so much prevailed between them and their masters; from what cause this distance (for I should be sorry to call it by any other name) arises, I am not able to learn, it certainly deprives them of those advantages which in a state of civil society is as necessary to be preserved between them. The natural effect of domestication, whether within or without the house, is confidence; mutual intercourse therefore, one would think, would produce mutual regard; how then does it happen, that masters too generally consider servants as necessary inconveniences, of whom sufficient unto the day is the evil thereof; and servants, on the other hand, daily change their situations, without regret and without reluctance. Servants are, it would seem, too apt to consider themselves as administering to the temporal advantages of their masters by their exertion and labour; without those returns of kindness beyond their mere pay, which is so necessary to smooth the rugged paths of life, and that when sickness or old age bring on incapacity, their former services are too apt to be forgotten, and they are thrown aside without protection. Their present duties are therefore performed without a desire or an interest in pleasing, and many farmers have too justly complained of a disposition to unsteadiness, a constant aversion to assist, as far as in them lies, to accelerate those improvements which their master may think necessary to make, and a general want of tractableness which prevails among the younger class of their labourers. Whenever there

is a want of attachment, confidence and fidelity are but negative terms, and there is at once an end of that harmony and of those ties which bind society together.

The rural artificers, such as wheelwrights, carpenters, smiths, &c. are in general as handy as those of most other counties, and execute their work sound and well, without pretending to any extraordinary expertness or ingenuity, if we except the two Corbets, father and son, whose soundness and neatness of thatching very far exceeds that of any other men in the county, and may vie with any in the kingdom; they live at Pile Hill in the parish of Woking. I think it is right to mention their names as a stimulus to others; and I am only sorry that I have found no other artificer that I could place in the same honourable station.

In general there appears a scarcity of labourers throughout the county, and it would seem that the last three harvests in particular have, in many places, felt the severe effects of this deficiency; some are of opinion that it proceeds from a great falling off in the number of the Irish, which had used to come over annually before hay time; others attribute it to emigration, particularly to America, owing to the great inducements which have been held out to them; while others, agreeing in both these ideas, add a third, of a more consolatory nature, that our improved system of husbandry has created a greater demand for labour. I agree in the latter conclusion most completely.

THE PRICE OF LABOUR FOR THE LAST THREE YEARS  
IS NEARLY AS FOLLOWS.

|                                                |                        | £. | s. | d. | £.    | s. | d. |
|------------------------------------------------|------------------------|----|----|----|-------|----|----|
| Bailiff .....                                  | per annum              | 16 | 0  | 0  | to 25 | 0  | 0  |
| Head waggoner with board                       | ditto ....             | 13 | 0  | 0  | — 15  | 0  | 0  |
| Second ditto .... ditto ..                     | ditto ....             | 12 | 0  | 0  | — 14  | 0  | 0  |
| If married and boards himself                  | per week               | 0  | 12 | 0  | — 0   | 14 | 0  |
| Ploughman, if very good ..                     | per annum              | 12 | 0  | 0  | — 14  | 0  | 0  |
| Under ploughman .....                          | ditto ....             | 10 | 0  | 0  | — 12  | 0  | 0  |
| Waggoner's boy .....                           | ditto ....             | 8  | 0  | 0  | — 10  | 0  | 0  |
| Ploughboy .....                                | ditto ....             | 5  | 0  | 0  | — 7   | 0  | 0  |
| Second .....                                   | ditto ....             | 4  | 0  | 0  | — 6   | 0  | 0  |
| Shepherd, and find a dog ..                    | per week               | 0  | 12 | 0  | — 0   | 14 | 0  |
| Common day labourer ....                       | ditto ....             | 0  | 10 | 0  | — 0   | 14 | 0  |
| Ditching, hedging, plashing<br>and bound ..... | per rod ..             | 0  | 2  | 3  | — 0   | 2  | 6  |
| Thrashing .....                                | Wheat .. per quarter   | 0  | 2  | 6  | — 0   | 4  | 0  |
| Ditto .....                                    | Barley .. ditto ....   | 0  | 1  | 6  | — 0   | 2  | 6  |
| Ditto .....                                    | Oats .... ditto ....   | 0  | 1  | 6  | — 0   | 2  | 6  |
| Ditto .....                                    | Pease .... ditto ....  | 0  | 2  | 0  | — 0   | 3  | 0  |
| Ditto .....                                    | Beans ... ditto 8d. to | 0  | 1  | 3  | and 0 | 2  | 0  |
| Ditto .....                                    | Tares ... ditto ....   | 0  | 1  | 6  | to 0  | 2  | 0  |
| Hoeing first time                              | Turnips per acre ..    | 0  | 6  | 0  | — 0   | 8  | 6  |
| Ditto second time                              | ditto .... ditto ....  | 0  | 5  | 0  | — 0   | 7  | 6  |
| Ditto .....                                    | Beans .. ditto ....    | 0  | 3  | 6  | — 0   | 5  | 0  |
| Ditto .....                                    | Peas .... ditto ....   | 0  | 3  | 6  | — 0   | 5  | 6  |
| Hand weeding .. Carrots                        |                        |    |    |    |       |    |    |
| first time .....                               | ditto ....             | 0  | 16 | 0  | — 1   | 1  | 0  |
| Ditto .. ditto .. ditto se-                    |                        |    |    |    |       |    |    |
| cond time ....                                 | ditto ....             | 0  | 6  | 6  | — 0   | 8  | 6  |
| Reaping .....                                  | Wheat .. ditto ....    | 0  | 8  | 0  | — 1   | 0  | 0  |
| Mowing .....                                   | Barley or              |    |    |    |       |    |    |
| oats .....                                     | ditto ....             | 0  | 2  | 0  | — 0   | 3  | 6  |
| Bagging .....                                  | Beans .. ditto ....    | 0  | 6  | 0  | — 0   | 7  | 6  |
| Hooking .....                                  | Peas .... ditto ....   | 0  | 4  | 6  | — 0   | 6  | 6  |
| Mowing .....                                   | Meadow                 |    |    |    |       |    |    |
| hay .....                                      | ditto ....             | 0  | 3  | 6  | — 0   | 6  | 6  |
| Ditto .....                                    | Clover for             |    |    |    |       |    |    |
| hay .....                                      | ditto ....             | 0  | 3  | 6  | — 0   | 6  | 6  |
| Ditto .....                                    | ditto for              |    |    |    |       |    |    |

|                 |             | £. | s. | d. | £. | s. | d.   |
|-----------------|-------------|----|----|----|----|----|------|
| seed .....      | ditto ..... | 0  | 2  | 6  | —  | 0  | 4 6  |
| Ditto .....     | Sainfoin    |    |    |    |    |    |      |
| for hay .....   | ditto ..... | 0  | 2  | 6  | —  | 0  | 5 0  |
| Ploughing ..... | ditto ..... | 0  | 9  | 0  | —  | 0  | 12 0 |

#### AMONG THE NURSERYMEN AND GARDENERS.

|                                                                     |                |   |    |    |   |   |    |    |
|---------------------------------------------------------------------|----------------|---|----|----|---|---|----|----|
| Day labourers .....                                                 | per week       | 0 | 12 | 0  | — | 0 | 18 | 0  |
| Trenching ....                                                      | two spades     |   |    |    |   |   |    |    |
| deep and two crumbs ...                                             | per rod ...    | 0 | 1  | 0  | — | 0 | 1  | 3  |
| Ditto .....                                                         | one spade      |   |    |    |   |   |    |    |
| deep and one crumb ....                                             | ditto .....    | 0 | 0  | 7  | — | 0 | 0  | 10 |
| Turning in .....                                                    | ditto .....    | 0 | 0  | 3  | — | 0 | 0  | 4  |
| Ditching .....                                                      | ditto .....    | 0 | 0  | 10 | — | 0 | 2  | 6  |
| Hoeing quarters .....                                               | per acre ..    | 0 | 6  | 0  | — | 0 | 8  | 0  |
| Women .....                                                         | per day ...    | 0 | 1  | 0  | — | 0 | 1  | 6  |
| Farming dairy maid .....                                            | per annum      | 5 | 0  | 0  | — | 7 | 0  | 0  |
| cook ditto .....                                                    | ditto .....    | 5 | 0  | 0  | — | 8 | 0  | 0  |
| Thatching without beer ....                                         | per sq. 8d. to | 0 | 1  | 2  | — | 0 | 2  | 0  |
| Turning dung heaps is generally done by the lump, as per agreement. |                |   |    |    |   |   |    |    |

#### IMPLEMENTS OF HUSBANDRY.

In a county bordering on the metropolis of the first kingdom in the world, to which place nearly the whole of its produce is conveyed, and where, in consequence of its local situation, so much encouragement is given to its agriculture, and to science in general; it is certainly not a little surprising that the instruments by which the extension of the former can materially be advanced is so little attended to by almost all descriptions of regular bred farmers. The reasons which are usually assigned for this backwardness are, in the first place, that it is impossible that any one machine can answer equally well upon all soils; secondly, that the continual influx of new implements would create an expenditure which they could not afford;

thirdly, that a great loss of time would necessarily ensue in making trial of these instruments, and, lastly, that as the future direction of these implements must be left to the labourers, who are always awkward, and in general untractable, and who have a constant antipathy to be put out of their way, the use of these implements is always hazardous and seldom successful.

These reasons deserve our serious consideration, and therefore before we can admit the conclusions that are drawn from them, we ought to examine the occasions that have produced them.

To the first statement we are ready to subscribe, that few implements can be equally advantageous upon all soils, but it does not follow as a necessary consequence that, because a plough does not do its work so well upon a sand as it did upon a clay, or vice versa, or in a soil that may not be free from stones, as in one that is entirely free from them, we are to reject it, if it can be proved that it does its work better and with greater facility upon our own lands than those which we are in the habit of using; or, which is the same thing, that we can plough an equal quantity of land equally deep, and turn the furrow equally well with two horses as we usually do with four horses.

To the second it may be said, that the continued influx of implements, if they tend to abridge labour, and at the same time to do it at a profit, is worth every farmer's encouraging, even should the expence of doing it in the first instance be considerable, and although it may in the long run be the means of fixing us with a number of useless implements; indeed without encouragement from



some quarter or other there would be no inducement for men of a mechanical turn to occupy their thoughts with the improvement of any of the implements now in use, or inventing others of an entirely new construction.

To the third objection, viz. the loss of time attending the bringing these instruments into use, it may be answered, that there must be an allowance made for the proper learning the use of them, in the same manner as every farmer is more or less obliged to submit to a great deal of bad ploughing in consequence of the ploughmen's teaching the boys who go with the plough teams, the manner of holding the plough, and the various modes of turning the furrow, &c. This loss is seldom or ever appreciated, although it makes a very sensible part of the concern of every farm, because the farmer says, it is his interest that these boys should learn every part of their business, that there may be always a sufficiency of those sort of labourers to create competition and to prevent those combinations which are too often the consequence of a scarcity. If this reasoning is good in the latter case, it must be equally so in the former, because unless we either abridge the quantity of labour in the manual operations of the farm, which is principally to be effected by improvements in the machines we use; or grow a much larger proportion of grain upon the same number of acres, and that produce finds a better price at market, it is impossible we can afford to meet the exigencies of the times, to pay a larger rent for our farm, or to sell our produce upon equal terms with our rivals on the continent. There is therefore, upon every

principle, a strong inducement for our encouraging the improvement and simplification of the implements we are obliged to use, and if we do not think much of the present loss we sustain by the badness of the work, and the loss of time which must be occasioned by teaching these boys, much less ought we to consider any loss of time an object that is occasioned by comparative trials or the introduction of new implements.

With respect to the last objection, it is, I apprehend, as much the fault of the farmer as it is of the labourer, that those difficulties which are there stated are suffered to have any weight; because, in the first place, if the instrument is very different in its nature from what a man has been always accustomed to, he will necessarily be at the first awkward in using it, but perseverance and due encouragement will almost always get the better of that awkwardness and make him more expert; but if from an untractable disposition the man cannot be brought to make use of it to the advantage of his master, which it can be proved that he might do by attention, there is no question but that the strong arm of the law will punish every such offender for his neglect and obstinacy. But I have been told that one man cannot attack a host, and perhaps were it to be attempted by the farmers in general seriously, all their business must stand still; to which I answer, that if the clothiers in Wiltshire, Gloucestershire, and the north, have been able to get the better of their men, who are a much more formidable body, and have effectually established their spinning jennies, and their other machinery, against the most violent and diabolical out-

rages that could be committed, no question but the same perseverance on the part of the great body of farmers in neighbouring parishes might effectually establish any implements they may choose; let them only make the trial, and let them take no servant without a good character under penalties, and that will operate as a caution to every labourer how he conducts himself. But again, says the farmer, if these people will not make use of these implements, is the business of our farms to stand still, our land to remain untilled, while we are disputing this point with our servants? Will our landlords excuse us from rent, and the government from taxes, during that period? These are important questions no doubt, but their importance sinks to nothing when put in competition with the great good that would arise, by establishing their superiority as masters over a set of beings who have every reason to comply with their just demands, and who alone are the proper judges of what is most likely to answer the ends for which these implements were invented. But as the business of farming is among the first concerns of the state, it would presently be an object for the consideration of the Legislature how far it is expedient to put an effectual stop to all such proceedings. As the case stands at present, every farmer is completely subservient to the whims and caprices of his servants, which is certainly a very retrograde way of conducting business, and this for no other reason than because farmers in general are too indolent and too narrow-minded to enter with spirit into any plans that may tend to counteract so alarming an evil. Let me ask the most rigid among them whether it be not an object,

if by simplifying the ploughs upon his farms, he can do the same quantity of work equally well with nine horses that used to require twelve? The saving to him would be great indeed, because that food which used to supply the three additional horses might either be sold and the produce applied to other purposes, or it might directly go to the support and increase of more profitable cattle, such as oxen or sheep, and in a general view of the subject would be a very great gain to the public, by increasing the means of our subsistence.

It would be an unnecessary waste of time, and perfectly useless too, to detail the several sorts of implements that are used upon every farm throughout the county: with but very few exceptions indeed I could do it, if it were at all necessary, but as that cannot be the case, I shall confine myself to the more prominent ones in the possession of the more experienced farmers, taking now and then a glance at others in the hands of those of more inferior rank by way of contrast. And first I shall begin with ploughs as the leading implement in the economy of agriculture.

#### PLOUGHS.

In the environs of London, and for the first ten miles on either road, the ploughs principally in use are the common swing ploughs, which, if well constructed, are pretty good implements, but they are such heavy and unwieldy instruments as always to require not less than four, but generally five and sometimes six large strong bony horses, which draw single, and plough about one acre a day. The length of the beam, which is of oak and somewhat

convex, is never less than nine feet, but more frequently ten feet five inches deep, by four inches broad; it has sometimes a straight mould board, sometimes a convex one, and sometimes a concave or elliptic one, but all of them are plated with iron. As they have neither foot nor wheel for their guidance, the whole direction and, I may say, weight of the instrument is on the ploughman's arms, which makes it a very laborious and fatiguing employment; for either by the resistance of a stone, a root of a tree, or the slip of his foot, the instrument is immediately thrown out of its work, sometimes upwards, at others downwards, notwithstanding its extreme weight. It is therefore impossible that the furrows can be of one uniform depth, and consequently the work will be found imperfectly done, notwithstanding all the care and skill of the workman; and it is more or less the case as the shape of the mould board tends to the straight, the convex, or the concave. For example, the straight mould board cuts the ground and lays it on its side, there is therefore no force or power to act against the sudden jerk of the horses, or any impediment that may be in the way, but out must come the instrument; nor does the straight mould board bury the weeds or the stubble, which is certainly a great defect. The convex board turns the furrows short over, without taking it clean up from the bottom, it does not therefore effectually bury the weeds, it makes a greater resistance than the former, consequently increases the draught, but that resistance is nevertheless not sufficient to counteract the unsteadiness of the instrument. The proper convex board takes the ground clean before

it from the bottom to the full breadth or expansion of the board, rather presses it forwards and gives it a large sweep completely over, or more properly turns the ground perfectly upside down, consequently weeds, stubble, &c. are effectually buried. Taking the ground in this bold manner, and suspending it as it were during its rolling over, the resistance is enlarged, and by so much is the draught increased; the plough however is kept more in equilibrio, and being less liable to be thrown out of its work, and performing it better as well by turning all the ground over, as by burying all the weeds, is a better instrument than either of the others, and therefore without assuming any superior merit above ploughs of other constructions may be said to be a useful one. The farming gardeners and cow-keepers plough a great depth, particularly for the larger sort of cabbages, savoys, and potatoes, and in a dry season, notwithstanding the prodigious quantity of manure with which their ground is generally saturated, they find a difficulty in ploughing with fewer than five horses, and they add a sixth whenever they tack a harrow to the side of the plough, which they often do as well to prevent the treading of the cattle upon the fresh ploughed ground, as to take advantage of the moisture of the soil to harrow it down, and to get their crops in quick. The wheels would very materially increase the value of this instrument, the point of the share might then be lowered, and the plough would go deeper upon any level ground with less risk of being thrown out of its work.

The plough which my father used for several years was the Rotherham, made by Winlaw, after

one of the best ploughs made expressly for him at Hull, but which he did not like. The one made by Winlaw, however, underwent so many alterations in the shape of its mould board, the position and length of the beam, and the form of the share, that ultimately it might be considered almost a distinct instrument. He always worked it with wheels.

The length of the beam was about six feet, the breast was nearly elliptical, and the bottom part of it, where the share joins to the mould board, was made as broad and as flat as could be well done, and was continued in a gently increasing sweep to the lower extremity of the board, which was about an inch wider than the fin of the share, which fin was something better than nine inches wide, taking especial care that it never projected below the point of the share.

The share, being made broad, enables the plough to cut the whole furrow which is intended to be thrown up, and turns the whole ground over neatly in the manner of the concave swing plough before-mentioned; whereas the narrow share would only separate a part, and the residue would be absolutely torn up by the wrest of the plough, without burying the weeds properly, because the whole of the ground was not cut and completely separated by the instrument.

The mould board was originally of cast iron, but finding that liable to crack and fly, he got his friend Mr. Cole, the engine maker, to construct him one from a mould of well tempered hammered iron, which he found keep true to its shape, and wore extremely well. With this plough he could

break up an etch as soon as the corn was carried, or a day in the driest time with four light horses, when his neighbours, whose lands were full of dung, could scarcely plough theirs with six strong horses. His soil being in places very stiff and near the gravel, which made it difficult to break up in a dry season.

Beyond the distance of ten miles, with the exception of the Guildford road, and for the next ten miles, the Kentish turnwrest is almost invariably used.

It is sometimes made to suit the quality of the soil, but when it happens to be made light and is well put together, it is among the best implements we have; generally however it is made so strong and heavy as to be a very cumbersome tool. I had one made under the directions of the late Mr. Ashby, by a man of the name of Simmonds, at Meretham, near Ryegate, who was considered by him to be one of the best wheelwrights in the county, the whole expence of which, including iron work and geers, &c. was £9 17s. 4+d.

In Kent however, they seldom exceed six pounds, but they are much inferior to this one made by Simmonds. My friend Mr. Smith, of Wilderwick, near East Grinstead, whose farming I shall have occasion to notice hereafter, has a very complete plough of this kind which will be detailed hereafter. The dimensions of mine were as follows :

The length of the beam is 9 feet 6 inches, which is made of oak, 5½ inches thick, and 4½ broad. The foot is 5½ by 3½, and 3 feet 8 inches long. The handles are placed above this, and secured to the end of the beam by tenons, and mortised below



to the chop. At 2 feet 6 inches from the foot is a piece of ash or oak 6 or 7 inches wide, and  $1\frac{1}{2}$  thick, which passes through the beam and is secured into the chops in a transverse direction, which places the share from 20 to 22 inches from the beam. The share is always made with wrought iron, and in general weighs, according to the strength of the soil, from 28 to 34 lbs. The chop to which the share is fixed is about 5 feet long, 5 inches deep, and 4 inches wide. The point of the beam rests on an upright carriage with two wooden wheels, from 3 feet to 3 feet 6 inches diameter, with wooden axletrees, above which the frame, or as it is sometimes called the gallows, which has a sliding bolster fastened up by iron pins let into certain holes to increase or decrease the height of the beam, and thereby to let the plough higher or lower into the ground.

In the centre part of the axle is a clasp iron to which a chain is fixed, and which is called the tow, which passes over the beam, so that by means of notches, or a pin like the Hertfordshire ploughs called a chick, the plough may be let out a greater length from the axle, which will let it into the ground to any given depth that a plough not professedly a trench plough can go. With this instrument I have broken up some uncommon stubborn lays in an unusual dry time when the ground was cracked and rent in almost every direction. But in the spring of 1802, I had a fair opportunity of witnessing the amazing strength and power of this plough, in breaking up the side of a very sharp hill full of large holes, inequalities, and irregularities; having strong roots of furze, fern, willow, and stones of six or eight inches thick, it took

eight horses or twelve oxen to perform it. The soil was a good loam in some places, in others a clay, but the whole on a substratum of blue clay; it required two able men to hold the plough, one and sometimes two to bear upon the beam to keep the plough in the ground, and two drivers.

Yet with this force, and notwithstanding the continual sudden jerks which the plough received by the inequalities of the soil, &c. yet every part of the tackle stood well, and nothing broke. It was very apparent that in this rough work the oxen were far preferable to the horses, the former by the slowness and regularity of their motion avoided the small holes and did not tumble about the larger ones; the horses on the contrary, from their impetuosity, were always falling, being scarcely recovered from one hole before they found themselves in another, which made them fret and jerk; injuring themselves, destroying their harness, and causing the plough to go in all manner of directions. It was not the fault of the plough, for every sort that could be procured for several miles was tried against the turnwrest, without the least chance of success, for the greater part of them were broken by the exertion, and not one of them did the work so well.

It must be admitted that this instrument is so heavy and clumsy as to be more calculated for the stronger soils than for the lighter ones.

Upon my friend Mr. Ashley's farm, at Woodmanstone, I have seen four large fine stallions, worth 50 or 60 guineas each, or more perhaps, and fit for Pickford's Manchester waggon, ploughing the fallows with this sort of plough, when, I am

sure that a small Rotherham, or what is called a wheel plough about Dorking and Guildford, with a pair of horses, would have done the work equally well. But as he had in other parts of his farm some very strong land, and as he prided himself upon his cattle, there might be some excuse for keeping a dozen or more such horses, besides lighter ones for other purposes, but none that I could ever see, for being bigotted to this instrument, and of course using four horses when he might with lighter ploughs have stirred the greater part of his land twice instead of once.

In laying down land to pasture the turnwrest plough has greatly the advantage over most of the others; the furrow is by the shifting of the wrest laid all one way quite flat, without laying it in lands or leaving an open furrow.

When it comes to be harrowed down, the face of the land becomes perfectly level, a circumstance of the greatest importance in all soils that are not wet, which, should even that be the case, a furrow or under drain here and there would sufficiently correct.

Beyond Godstone and Rycgate the turnwrest plough is made lighter, and is used without wheels to enable the horses to go at length, the land being in general wet. In some parts of the same neighbourhood the snap plough is much used, which answers the same purpose as the turnwrest: it has a double cast iron shifting mouldboard, which at the end of each land is knocked in or out as the furrow requires to be turned: the operation is very simple, and when the mouldboards are well shaped and turned, it is not a bad instrument, but it is

used without wheels, which I think an objection, for the reasons before stated. It is however in high estimation by the ploughmen.

Monsieur Hussard took over a model of this plough to France, which he exhibited at the National Institute when I was present, and the members appeared much gratified with the simplicity of it.

About Dorking, and in all the district to the south, and south west of the county, the single wheel plough, with but little variation as to size, is uniformly employed; it is a light instrument and seems to perform its work very well. The following are the dimensions of almost a new one (and which was considered one of the best,) which I took in the course of the survey. The beam is made of oak and forms an arc; that part of it which is nearest the handles is  $4\frac{1}{2}$  inches broad, and about  $5\frac{1}{2}$  inches thick upon the average, these dimensions extend two feet six inches in length along the beam, which is of one entire piece of oak, but they rather diminish in width and thickness from the handles beyond the first length; the beam is considerably reduced every way to the extremity thereof, which is 3 feet 3 inches, making the extreme length of the beam 5 feet 9 inches: the thickness of the smaller is not more than  $3\frac{1}{2}$  and the width  $\frac{1}{2}$  inches: at the extremity of the first dimension along the beam of 2 feet 6 inches, a slip of ash of two and half inches wide and four feet in length is bolted to each side of the beam, which slip takes a diagonal direction so as to clasp the axletree of the wheel. At 6 inches distance from the wheel, so as to clear it, an upright slip of ash about three inches wide

is secured to this diagonal one and passes through the head of the beam, this slip is perforated with holes to raise or lower the plough, and in general keeps the beam about two feet from the diagonal slip: the wheel is above 18 inches diameter; the mould-board is very short and elliptic, having a triangular share projecting about half an inch beyond the mouldboard: the whole instrument is short and compact, and sufficiently strong for almost all the lands throughout that district, but where it is not, they have recourse to the turnwrest.

Beyond Kingston, and when we arrive at Esher, we find the memorable Mr. Duckett's inventive genius furnishing the farmers with a variety of well formed ploughs for their light sandy soils; many of these ploughs I have formerly seen tried before the committee of society of Arts, Manufactures, &c. (of which my father was many years a member) upon our ground at Stockwell: one of these ploughs was intended for light sandy soils, in which his intention was to bury the sod or turf a considerable depth, to prevent the manure from being washed down beyond the reach of the roots of the plants. It was performed thus: the coulter was so formed, by having a wing or mouldboard fixed to it about half way up, that in its progress through the ground it not only cut the turf or surface and turned it over, but the share following immediately after raised an additional quantity of mould from the same furrow, and turned that completely over upon the former layer, by which operations there is a greater depth of soil to cover the weeds and stubble, &c. more effectually; and as drilling is almost the invariable practice there, it enables them to do it with more certainty of not

disturbing the weeds, &c. during the drilling, as well as having a moister, deeper, and fitter soil for that purpose.

The next plough deserving our notice is one which is intended for trenching of stubbles without either turning the turf or surface, or making a furrow.

This instrument has two shares placed behind each other, the first is situate at about one third of the length of the beam, the other at the same distance from the first; each of these shares are supported by two upright bars or coulter of iron about two and a half inches wide and three quarters of an inch thick, which pass through the beam, and are let up and down the same as any common coulters; the fronts of these bars are brought to an edge, in order that they may cut their way through the ground, and are fastened to the shares by screws and nuts; the front share has its broadside to the left, the hind one to the right. The beam is a straight piece of oak about six inches wide at the handles, and gradually reduced to about four inches at the point: its position is that of an inclined plane, being rather better than as high again from the ground at the point as at the end of the beam; the handles are set on each side of the beam at about six inches from the end. Its mode of operating is thus performed. It slices or pares off the surface from three to four or more inches deep; by which operation the stalks of the weeds such as thistles, &c. are cut asunder so much below the surface, while the seeds are left on the surface; as no part is turned over, and as the under stratum is only loosened, neither the seeds nor the weeds are buried by the operation.

There are a few Norfolk ploughs in the eastern district, but they are seldom used: there have been some very experienced Norfolk farmers who have taken farms in this cold stiff part of the county, where they could neither make their ploughs answer, nor their system of farming, and have been obliged to give up their farms and return to their own country. Since writing the above we have a Mr. Woodroffe from the neighbourhood of Woodbridge in Suffolk, who appears to be a very sensible practical farmer, who works only a pair of horses, and ploughs deeper than his neighbours and predecessors did with four, with Suffolk ploughs. His farming is very different from the practice of this county, and appears very rational, and therefore I hope he will succeed.

#### THE STRIKE FURROW PLOUGH

For landing up and opening water furrows is an instrument common in every country, but the one I am about to describe is somewhat different from those in general use. Its beam is serpentine shaped, 7 feet 6 inches long,  $4\frac{1}{4}$  inches deep, and  $3\frac{1}{4}$  inches wide, the edges being rounded; the mould board is double, that is it has a mould board on each side of the beam, of two separate pieces of wood differently shaped; the upper piece nearest the beam is straight, and follows nearly the course of the beam, the lower part of it however takes a diagonal course towards the stump, beyond which it projects about nine inches; the whole of this piece forms an irregular triangle, the piece is something like a wrest in shape, being convex, it joins the upper one to the chop in the front, and it encreases

its height as it proceeds to the end, where it is cut off square, in a line with the termination of the upper one, its height being there eight inches; the front of the mould board meets in an acute angle forming a diagonal line, and is 1 foot 2 inches in depth to the chop; the medium length of the mould board is 3 feet 11 inches, it is secured to the chop at the bottom, and by a bar across from one mould board to the other, the hinder part keeping them asunder at the distance of 14 inches.

The beam is mortised into the stump, and the handles are fastened on each side of the stump by a pin passing through them, which is 6 inches thick and  $4\frac{1}{2}$  wide. The stump is mortised into the chop. The sheath passes through the beam and at 14 inches from the stump is mortised into the chop, and forms a rib to secure the mould boards together in front, it is 5 inches wide; the share is 11 inches from the face of the mould board and is shod with iron, its shape is not material, but in general like the common swing ploughs.

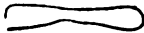
Mr. John Newnham of Horley, a very sensible plain intelligent farmer, has a strike furrow plough with moveable mould boards; these he rises or falls to increase or decrease the depth of the furrow, according as the land is more or less moist and tenacious, and as it is capable of being set wider or narrower as occasion may require.

#### THE DOUBLE TURNWREST PLOUGH

At Wilderwick is an instrument so complete of its kind in all its parts, and performs its work so admirably, and being the only one I have met with in



the county, I have been the more particular in forming a sketch of it, and in taking its dimensions, which are as follows:

Beam, 8 feet 6 inches long; ditto,  $5\frac{1}{2}$  inches thick next to the stump, but reduced to about four inches at the point; ditto, 5 ins. wide. Chop to share, 3 feet 5 inches long; ditto, 5 inches wide; ditto,  $5\frac{1}{2}$  inches deep. Stump, 3 feet long, mortised into chop and handles fastened to stump on each side of it; ditto,  $8\frac{1}{2}$  inches deep at the chop. Beam is mortised into stump at 8 inches from the chop, where the stump is 6 inches thick and  $4\frac{1}{2}$  wide. From the back of the stump the drawing bar commences and goes to about 12 inches beyond the coulter, where the chain is fastened to it, and is fixed to the axle-tree of the wheel by a staple, at 1 foot 4 inches from the stump along the beam is the sheath, 5 inches broad; ditto,  $1\frac{3}{4}$  inches thick, passes through the beam diagonally and is let into the chop 1 foot 2 inches from its point where the wrest projects in front of the chop. At one inch from the sheath an iron bolt goes through the beam and passes to the chop, close by the point of the wrest within side of it. False wrest is 2 feet 9 inches long, stands out 9 inches from the beam at the end; ditto, 4 inches deep; ditto, 3 inches thick. Below the beam in front, 9 inches, but level with it at the end next handle. It is shod with iron in front where it forms an acute angle  $<$ . Real wrest is one inch below, and clear of the false wrest, and four inches from the ground, and stands out 11 inches from the beam, is 5 inches deep; ditto, 4 inches wide; ditto, 3 feet 7 inches long. Share is 1 ft. 8 inc. long, and forms this shape  Coulter passes through beam at 1 foot 8 inches from the sheath, is kept in its place by a wedge on upper side, and by a chain secured to the beam on the under side, and to the coulter about down it. From point of beam at 4 feet 4 inches is the cork pin, a piece of iron fastened to the beam to turn the coulter with. From cork pin at about 7 inches is a hole to put in a pin; at six inches from that hole is another, and at 5 inches is another, which being fastened to the gallows by a chain, varies the depth of the plough. Collar chain passes over the beam at about 10 inches from the gallows, to keep the machine tight together. Wheels are nearly 3 feet diameter. Beam at its point is 4 feet from the ground line. Gallows is 2 feet 6 inches high. Upright standards,  $2\frac{1}{2}$  wide, increase at

bottom to three inches; ditto,  $2\frac{1}{2}$  thick. Top bar,  $2\frac{1}{2}$  wide; ditto,  $2\frac{1}{2}$  high. Bolster, 4 inches wide; ditto,  $4\frac{1}{2}$  high. Wheels, one foot 2 inches apart. Gallows at top, 6 inches wide; ditto at bottom,  $6\frac{1}{2}$  ditto.

I have met with a turnwrest plough, or as it is, I believe, called shim or skim plough for stirring of fallows, which as far as it went was a very good instrument, the wrest was taken off and nothing but the coulter and the share was used. The latter was however very differently shaped from that used at ploughing; this was in the shape of a crescent, or exactly like a gardener's edging iron, and from 10 to 12 inches wide: the object of it was for cutting the stems of the weeds, three or four inches below the surface, and to loosen the ground, the harrows afterwards followed, dragging the weeds thus cut up to the surface in order to their being burnt. Upon a pea or bean etch I have seen it used with great success, and where the land is not very stiff, two good horses will get over four acres a day. But a far better tool is the

#### NINE SHARE PLOUGH,

At this time much used about Guildford, it is drawn by six horses, and gets over eight acres a day with very great success, the description of it which follows is taken from a very capital one in the possession of Mr. Birkbeck, whose farming, &c. I have frequent occasion to resort to.

This instrument, (for it is I think a misnomer to call it a plough,) has two bars parallel to each other at the distance of seven inches, these bars are four inches wide, and as many in thickness; the hinder bar is 7 feet 6 inches long, through which

five tines 18 inches long are placed; the front bar is 5 feet 9 inches long and receives four tines, these bars are joined together by three cross bars one at each end, and the other in the centre of the same thickness and width in the centre, but increasing the width as they approach the bars, the beam is 5 feet 3 inches in length, four inches wide, and four thick, and proceeds from the centre cross bar; it is further strengthened by a strap of oak proceeding from the front bar in a curvilinear direction until it reaches the beam rather better than half-way, where they are bolted together; within six inches of the point of the beam an iron rack passes through it, to raise or lower the instrument in the ground, and to this rack is fixed the wheels which are eighteen inches diameter, the tines are one and half inch square for nine inches, and then they are hollowed out like a spoon for six inches, and terminate in a point three inches longer; these points are made to project forwards in order to enter and loosen the ground; these tines have a neck after they pass through the bar, where they are made secure by a nut, and the hole which they have passed through is protected by a plate of iron made to fit exactly the neck of the tine, so as to give it but as little play as possible. The whole instrument is made uncommonly strong, and complete costs about ten guineas.

Note—It is not very dissimilar to the nidgets used in hop gardens, only the latter have hoes to them and this instrument tines.

**DRILL MACHINES OR PLOUGHS.**

These machines are constantly used in all the sandy and loamy district, from Esher to Bramley, &c. for sowing wheat, barley, and pease. These instruments are about 18 inches wide, and sow two rows at nine inches, or only one as may be required. They go upon wheels with a pointed share before the funnel, the seed is put into a hopper. The whole instrument is very light and costs about £3 3s. complete.

**COOK'S DRILL PLOUGH.**

Among the many ingenious contrivances for sowing of seed, no instrument that I have ever met with seems to have answered so completely as the one I am about to detail. From the many proofs that have been certified by persons of unquestionable veracity of the great success which has attended it, as well by the great saving of seed corn, as by the vast increase of produce, I confess I have not been a little disappointed in finding so few of them in use in that part of the county at least, where drilling has been practised for many years, and where in course its practice is understood, and the advantages resulting from it tacitly admitted.

The great expence of it has been held out by some as deterring them from the purchase; the frequent breaking of the cups, by the carelessness of a set of awkward servants, and what is called the complexity of the machinery, which they say is difficult to put to rights, have collectively conspired to prevent the general use of it.

I was in hopes that Mr. Cook, would have fur-

nished me with a sketch of his plough with any late improvements, and with such additional documents of its superiority, and of its widely extended employment, as to have enabled me to have laid them before the public in this work; but although I wrote to him and stated the reason of my application, he did not think proper to take the least notice of my letter. This usage does me no injury, but I have a right to say, that when he wanted my assistance formerly to try his different implements upon my ground, and which not only was attended with a great deal of trouble, loss of time, and oftentimes loss of profit by accommodating him, and substituting crops to suit his machinery instead of those which were intended to have been sown; and when he had occasion for attestations to prove the advantage of his machines, his behaviour then by no means corresponded with this recent one. Had any difference of opinion or quarrel happened at any time between us, that might have been a sufficient reason; but I know of none in the most distant degree, and therefore the behaviour cannot but appear the more remarkable. I have however done with him, and shall return to the machine for the information of those who have never seen it. The sketch I have made is taken from one which I purchased of him for a friend in Hertfordshire; it is drawn by a pair of shafts fixed to the axis of the wheel. The wheels are so contrived that the horse may go in the furrow, without setting a foot upon the land, which is a very advantageous mode, either in wet weather or when the land is so soft as not to carry a horse without poaching. It has a coulter beam with

holes or mortises at different distances, by which the distances of the drills may be varied at pleasure; this beam is attached to the axis by hooks and eyes or staples.

It is readily moved to the right or left, by the person who attends the machine so as to make the drills perfectly straight; which is of great consequence in hoeing.

It has two handles which are fixed to the coulter beam by means of screws, bolts and nuts, for the proper guidance of the machine.

There is a row of upper seed boxes divided into partitions, covered by a lid, to preserve the seed from rain or wind; and two lower seed boxes in partitions.

There are slides between the upper and lower seed boxes, to prevent the grain or seed descending too fast into the lower boxes; by elevating or depressing these slides, the quantity of grain, or seed distributed in the drills, may be varied at pleasure.

When the slides are at the bottom of the grooves, the wheat cups or ladles, painted red, will distribute about three pecks per acre. When raised about two inches to the topmost holes, and supported there by hooks going into holes in the plates of the slides, something more than five pecks will be sown; and by fixing the slides at any intermediate height, the quantity of seed sown may be varied accordingly. When barley is drilled, if the slides are at the bottom of the grooves, the cups or ladles painted green, will distribute about one bushel and half per acre, and more in proportion as the slides are elevated.

For sowing beans, peas, oats, &c. if the slides

are at the bottom of the grooves, the cups or ladles painted yellow, will distribute near two bushels per acre, and more in proportion, by elevating them as above, up to three bushels per acre.

It has a cylinder, with cups or ladles of different sizes, for different sorts of grain or seeds, by which the grain or seeds are taken up and dropped into the funnels, and conducted by them into incisions or small drills, made in the land by coulter, which are grooved to receive the tubes of the funnels, and are placed immediately before them; they also preserve the tubes of the funnels from being injured by stones, &c.

There is a chain and a hook applied to the coulter beak and axis of the wheels to prevent the coulter going too deep in the land; also to prevent the coulter beam dropping so low, as to unshift the upper funnels, in crossing deep furrows or gutters; on which account, when the machine is at work, the last link of the chain should always be upon the hook.

A pin of iron is projected from the coulter beam, which being lifted on to the hook, at the end of the land, will bear the coulter out of the ground, while the machine is turning round at the end of the land, or on any other occasion, without any labour of the man who attends the machine, in supporting the same.

A cog wheel is fixed upon the nave of the right carriage wheel.

A cog wheel is placed upon the left gudgeon or axis of the cylinder that contains the cups which is turned by the left carriage wheel, so as to distribute the grain or seed as before observed.

There is a lever and string passing over a pulley to the axis of the cylinder, by moving this lever to a notch in a staple fixed to the upper boxes the wheel on the right hand of the cylinder will be lifted out of gear with the cog wheel that is fixed on the nave of the right hand carriage wheel, by which means the distribution of grain or seed may be stopped at pleasure in an instant at the end of the land while the machine is turning round, or on any other occasion.

An iron bar, with holes in it, is placed on the front of the seed boxes, by means of which, and a pin going through the holes the seed box may be elevated or depressed, so as to keep it horizontally level, whether going up or down steep hills.

There is also a mode of preventing the wind from interrupting the grain or seed in its descent from the cups or ladles to the funnels, and will also prevent dirt or soil falling from the wheels into the funnels.

Two hooks are fixed to the handles of the machine, to which weights, or a beam of wood of a proper weight, may be applied to force the coulter, if necessary, deeper into the ground.

In conveying the machine from the farm yard to the field and back again, the machine is managed in the same manner upon its own wheels, that the coulter beam is supported at the end of the land, and this without the trouble of shifting or unshifting a single article of the machine, and by putting the link of the chain on to the hook, without the least danger of injuring it upon the roughest road.

Lands or ridges, four feet six inches wide, on strong  
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clays, or cold wet soils, or ten feet wide on dry loams, are best calculated for the system of drilling.

Where lands or ridges vary in size and width, or where there are no ridges or furrows, one or more funnels may be stopped with a little paper, and the seed returned into the boxes at the end of the land, in order to join the rows more regularly.

One horse is sufficient for the draught of this machine, in its improved state, upon strong land.

The properest time for drilling is most certainly in a fair season, and when the land is sufficiently pulverized and dry; which may in general be insured, by having the land ploughed up ready for sowing in good time, and by embracing the first opportunity; whether it be a fortnight sooner or later than the exact periodical time of sowing is not material, especially as so much land will be drilled in so little time, viz. ten acres per day with one man, a boy, and a horse. The land ought to be previously harrowed to level the surface, and where lands are made of a proper size for the horse to go always in the furrows, as above, a driver is not at all necessary.

If on high ridged lands, when the horse goes in the furrows, the person who attends the machine does not chuse to be at the trouble of influencing the direction of the coulter, by moving the coulters beam to the left or right occasionally; a rope or chain, by being applied to the axis of the wheels, and also to the coulters beam, will prevent the coulter from inclining towards the furrows, and will keep them in one uniform direction.

In drilling lands or ridges, more than twice the

width of the machine, or level lands without ridge and furrow, in order to join the two outside drills regularly, the wheel of the machine must be brought very near to the last outside drill: and if a space of 14 inches is allowed for the horse to walk in, for the purpose of horse hoeing, the wheel must return in its own track.

Having thus described the machine with the manner of using it, I shall only state a case or two by way of proving the great advantage that may be derived by a more general use of it. At the request of a committee of the society of Arts in London, my father and I allotted three acres of land at Stockwell, in the year 1785 and 1786 (which had produced a crop of early peas, and had received two good ploughings after they were off, but without receiving any manure,) for the purpose of a comparative trial between the drilling by this machine and the common broad cast mode. On the first acre there were three bushels of wheat drilled, on the second acre there were 24 bushels drilled, and on the third acre there were five bushels sown broadcast. From the first acre there were produced 70 bushels of wheat. From the second acre there were produced 74 bushels of wheat. From the third acre there were produced 62 bushels of wheat. These totals are to be understood as including the tail after the rubbish was taken from it. The advantage in favour of the drill is here very conspicuous, making one quarter of wheat in the first acre, and one quarter and half sown broadcast; they both looked very promising through the month of May and beginning of June, but after

that period the weather setting in sultry and dry, the broadcast after flowering went blind, as it is called, and became blighted and died: the drilled stood its ground, went on with vigour, and produced as fine a crop as was ever known; there was no difference in the soil, for a furrow previously struck for the purpose, divided the ground, but it arose entirely from the drill having deposited the seed at a regular and greater depth in the ground, when a great deal of the broadcast was little more than on the surface, and perished in the dry weather for want of moisture.

It proved to be the case almost throughout England that season, and nothing therefore could shew the defect of the broadcast more; the seed became of course very scarce. We always attributed the saving of this crop to the drill.

The experiment about the wheat is recorded in the transactions of the society of Arts, &c.

Mr. Boote, a very intelligent and capital farmer of Atherston, near Stratford upon Avon, in the county of Warwick, sowed the same year upwards of 360 acres with the drill, and he computed that in the article of seed he saved no less than £150, which by the usual mode of broadcast would have been thrown into the ground. The following year viz. 1787, the same gentleman sowed 450 acres, viz. 126 acres with wheat, 128 with barley, 45 with beans, 18 with peas, 45 with oats, 6 with tares, and 82 with turnips. See transactions of the Arts and Sciences, vol. vi. page 74. He calculated that he gained by drilling this year no less a sum than £700 more than he would have done if he had sown his land in the usual way.

## DRAG HARROWS.

These implements are pretty general throughout the county, but the best which I have met with is to be found at Wilderwick, and in rough ground is hard work for four good horses; its dimensions are as follows—the front is six feet wide and the bar four inches wide, the end is 6 feet 8 inches wide, the bar is four inches wide and  $3\frac{1}{4}$  thick; the side or upright bars or bulls are 4 feet 10 inches long upon a medium, three inches wide, and  $3\frac{1}{4}$  thick; of these there are six, which in the front are 11 inches asunder, except the two centre ones which are only 10 inches asunder. At the rear the bars are each 12 inches asunder. There are four cross bars between the first division, they are 12 inches, the second 16 inches, and the third and last division, 14 inches asunder.

There are 30 times six of them within one inch of the front bar parallel to it, and through the upright bars. The second row is within one inch of the second cross bar, but in the same division. The third row is in the centre of the middle division, which is also the middle of the harrow. The fourth row is in the third division within one inch of the third bar, and the fifth row is in the same division, and about an inch from the end bar; from the front part of the second upright bar on the left side, a bar of hammered iron, about an inch and quarter wide, is screwed on the upright bars in a transverse direction to the end of the outer upright bar; this bar is full a quarter of an inch thick, and serves to secure all the work together. The tines are full 11 inches long, and made of very stout hammered iron,

and placed rather coming; they have a shoulder underneath to prevent their rising, and they pass through a plate of iron where they are secured by a pin or key, by which means they are effectually secured from moving about and wearing the bars.

#### THE LESSER OR SEED HARROWS

Are generally used in pairs; but some, in order to accelerate work, join three, and sometimes four together; they are coupled together by a short chain from the one into a staple on the other, and further secured by an iron strap which is laid across the centre of each harrow, and fastened down to one of the extreme bars of each by an iron bolt and key; when thus coupled the left hand one has a tug fastened to the point of the outermost bar in front, by which means they are drawn diagonally in order that the tines may move all the ground. They are made of ash, three feet wide in front, and four in the rear, and the medium length four feet. According to these dimensions they are divided into five longitudinal bars three inches wide and three inches thick, and into four cross bars one and a quarter inch thick, and three inches wide: at the front, these longitudinal bars will be five inches asunder, and eight and a quarter inches in the rear; the cross bars will in the front division be five inches asunder; the middle division will be  $11\frac{1}{4}$  inches wide, and the rear division will be ten inches asunder. The tines are in number 24 within the first division in front, and close to the first cross bar there are only four, because the tug proceeds from the left external bar. In the second division, and

close to the second cross bar there are five tines. In the same division, and close to the third bar there are also five tines. In the last division there are ten tines placed in the same manner as in the second division, each tine is 11 inches long, well secured by shoulders, plates of iron, and pins.

From this description of the harrow, I will venture to pronounce, if the timber is well seasoned, and the tines made of well tempered iron, and the whole properly put together, that it is an instrument of its kind one of the best that can be constructed.

#### BUSH HARROWS

Are generally composed of black or white thorn, or a mixture of both, and are sometimes drawn through the bars of a field gate or a frame made something similar to it; they are at other times, and for other purposes, drawn between the bars of the small or seed harrows. As their use is pretty generally known, I need only say, that they are, when made upon the former construction, always used for harrowing grass land, in order to level worm casts, and after a coat of dressing, to separate and more minutely divide the particles of dung, chalk, marl, &c. previous to the grounds being rolled. When the bushes are applied to the harrows it is generally for the purpose of covering clover, trefoil, and other grass seeds in a more regular way, and not so deep as the common harrows would do; and it is used upon long neglected sward land that is overgrown with moss, lichens, and coarse grasses, which it very much tears up, divides and destroys.

Upon very stiff land these harrows are very sel-

dom used to cover in the seeds of grasses, but I am persuaded that whenever the land is at all in condition to sow seed of any kind, these harrows made in the latter way, will cover the seed infinitely better than any common harrow without them can possibly do; for if there is any fine crumbly, or pulverized soil upon the surface, the bush harrow will drag it into the crevices which may be left among the clods, and thereby cover those seeds that would otherwise be left exposed, which in a drying seed time is of the greatest consequence to the equal vegetation of the seeds, and to the future success of the crop.

#### ROLLERS

Are in general of two dimensions in the possession of the farmer, which consist of the light or barley roller, and the heavy or grass roller; but there is a third sort in the possession of the gentleman, which is called the park roller.

The first is usually 6 feet 6 inches long, and ten inches diameter, sometimes with a pair of shafts fixed to a light frame over the axis, and drawn by one horse; in others it has only the axis, to which the traces are applied and drawn by one horse; there is as little expence about the latter as can possibly be to any instrument, but they are less true in their revolutions, being sometimes choked up by dirt and weeds, and then they always drag, which is sure to be injurious to the crop; they are only used after sowing, to close the ground gently together. The larger rollers are from seven to nine feet long, and from 20 to 30 inches diameter, in general made of one solid and tough piece of oak;

they have a frame of oak, ash, beech, or elm, and are drawn with a pair of shafts composing part of the frame by two or three horses, according to the nature of the work. Sometimes indeed they have two pair of shafts. If it is on a rough piece of arable land, and the intention is to break the clods, four horses are necessary, because it is sometimes proper to load the roller with posts and logs of wood to increase the weight before much impression can be made upon the clods of earth; when it is applied to pasture ground, the roller is always loaded, and then four horses are absolutely necessary, which are best worked abreast, instead of at length.

Among the largest and best wooden rollers I have met with in the survey, was that at Worplesdon, belonging to Mr. John Martin; it was five feet diameter.

Three wheels being made in the usual way, of an exact height, having one common axle-tree about 16 inches diameter, not made round, but cut into as many sides as there are spokes in the wheel; upon the rim of these wheels very narrow oak planks  $1\frac{1}{4}$  inch thick are nailed, to form the surface of the roller, and the better to secure their fitting without lessening the substance of the planks by paring off their edges. The frame and the double shafts are made uncommonly strong, and the whole work is well executed. This roller is sometimes loaded, and when I saw it at work, it seemed to make a very sensible impression upon the sward; by greatly flattening its surface.

Upon enquiring of the man what might be its supposed weight, he could give me no account;



but judging from circumstances, I was led to conclude that it was somewhat about one ton and a quarter. I asked him also if a common roller of 30 inches diameter, loaded to an equal weight, would not compress the ground more, make it more uniformly flat, and not pass over any inequalities in the soil without levelling them also, which it is well known the park roller does, to which he answered, that he did sometimes find that objection to it, but he added that the farmers all round that neighbourhood, who were in possession of very good common rollers, were always so anxious to borrow it, as sometimes almost to let the season get too forward before it came to their turn to have the loan of it; from which he was led to conclude that it was better calculated in their opinions at least for rolling of grass land.

In parks it is usual to have a roller of the dimensions above described nearly, made of cast iron, after the manner of the garden rollers, with a smaller roller within side of it; some of these rollers have only a simple frame and a pair of shafts, and are drawn by two horses in length, others have a cart or open box screwed down to the frame, but placed immediately over the roller, in which are placed old iron, large stones, &c. in order to load it the more effectually, and drawn by four horses abreast. Some of these rollers are divided into two, viz. there are two separate rollers within the same frame for the convenience of short turning, without tearing the ground in the manner which so large and weighty a body is found to do at the ends of the field; the larger the diameter of these cylinders, the less pressure do they produce on the

surface of the ground, because their size increases the quantity of surface over which they bear, and that circumstance lessens the resisting weight, and therefore upon mathematical principles they are not so effectual as those of a lesser diameter.

The effects produced by rolling will be treated of hereafter.

Mr. John Newnham, of Horley, has an exceedingly well constructed spike roller, which he finds of great use in his stiff wet soil in a dry time to pulverise his soil; he abounds in mechanical agricultural implements, which he not only lends to his neighbours and strangers, but will instruct them on their own farms in the use of them; he farms with great neatness and success.

#### NIDGET, OR HORSE HOE.

These implements are of various constructions, depending in a great degree upon the uses to which they are applied. The nidget is properly an instrument more generally used about hop gardens, while the true horse hoe is calculated for drilled pease and beans, wheat and barley. The principle of both is very nearly similar, the chief difference being in the disposition of the hoes, and in the latter having generally tines as well as hoes; the former is also a much larger instrument. I shall therefore give a description of it. It is 1 foot 6 inches wide in front, 4 feet 6 inches wide in the rear, and five feet long, it has four cross bars, the front and the rear being three and half inches thick by three inches wide, the other two are one inch thick by three inches wide, the longitudinal bars are each of them three inches thick, and are five

in number. In the rear, the two external divisions are  $10\frac{1}{2}$  inches each, by nine long; the two centre ones are  $11\frac{1}{2}$  inches each wide; in the centre division the two external partitions are 1 foot  $7\frac{1}{2}$  ins. long, by  $6\frac{1}{2}$  inches wide at the second bar. While the two middle partitions are 1 foot 7 inches long by four inches at the second bar. In the front division the two external partitions are four and a half wide next to the front bar, by 11 inches long, the two centre partitions are only one and a quarter inch wide by 11 inches long. It has two handles which are screwed on to the two second longitudinal bars reaching as far as the second cross bar from the rear, and are 4 feet 6 inches long, with a cross bar to keep them in their proper places at two feet from the rear bar; it has a beam in front making part of the centre longitudinal bar, which is curved, and which lodges on the bolster of a gallows, as the instrument rests upon a pair of wheels. This beam is 2 feet 10 inches long, and  $3\frac{1}{2}$  inches thick at the front bar, to which it is bolted down, and is reduced towards the point to about  $2\frac{1}{4}$  thick. The tug chain proceeds from the two bars at the junction of the handles. There are four hoes fixed to long shanks which pass through the longitudinal bars within one inch of the rear bar, and one hoe passes through the centre bar at about the middle of the rear division, and it is continued by a long piece of bar iron to the middle of the centre division where it meets a shank which passes through the middle bar of that division, and there forms a large hoe, and being thus united together the strength of it is greatly increased.

In the centre division there are two hoes within

one inch of the second cross bar passing through the two external longitudinal bars within one inch of the third cross bar. And finally, two holes in the front division passing through the two second longitudinal bars; that on the left being within two inches of the front bar, and that on the right within six inches of the front bar. These hoes are in shape like a heart, and the shanks about fourteen inches long from the underside of the bars, are sharpened and like a coulter in front, in order to cut through the ground, and after passing through the bars, stand about an inch clear above them, where a pin or key is put through them to secure them in their places; but there are a few more holes pierced through the shanks at different heights to let them higher or lower into the ground; the whole number of hoes, including the long one in the centre, are 13. The hoes ought to be well steeled.

This instrument is drawn by two horses at length, and not only loosens and pulverizes the ground, but keeps it very clean and moist also.

The horse hoe is in shape like the nidget, being narrow in the front and broad in the rear, with a beam and handles, but no wheels: it has eight or twelve strong tines, and either three or five hoes according to the size of it; the tines being placed all before the hoes, open and prepare the ground for the hoes in a far better way than if they were all holes, for the tines will enter the ground when hoes alone could not, and as the latter are so placed as to cut all the ground clean, every weed must be separated and cut up by them, so that they are afterwards easily brought to the surface by the har-

row; of these horse hoes my father had three, two of which were very capital implements, but the third which was made by Winlaw, and was to have been an improvement on the others, had indeed a small wheel to it which was let up and down, in order to regulate the depth, but in other respects was so very inferior to them, as to induce him to lay it aside altogether. In drilled crops of peas and beans I know of no instrument that could be used with more advantage; and the only defect that I ever found attending these horse hoes, was that of compressing and hardening the surface immediately below the hoes. I have constantly used it to stir ground after a drilled crop was carried, and that as soon as possible, and by drawing it across the drills, whatever weeds were there, and which had grown among the crop, were by this means destroyed, and the ground was put into a state to receive the dews and any rain that might fall.

It prepared the way so completely for the first ploughing after a short lapse, especially if any rain had fallen, was it ever so little, that it was always found that that little had moistened the ground to the depth of the hoeing, while the same sort of land that had not been so served, was baked, and so coalesced, as not to be broken up by a common plough without five or six horses. The dews and the rain that might have fallen were quickly evaporated, and consequently instead of being of service to moisten the ground, they only tended to unite the particles of it more closely together, and thereby to prevent the proper effect of the plough. All these hoes however, it must be confessed, are more calculated for land that is free from stones,

than for flinty or gravelly soils; not but that I should use them on both these soils, when I have seen their good effects strongly marked by the uniform cleanliness of the ground and the fine state of it.

All this may be done as well, for ought I know, by the cultivator, but not better.

#### OF CARTS AND WAGGONS.

Within ten miles of London there are a great many large six-inch wheel hay carts in use, made much after the same fashion as those in Middlesex; these are used exclusively for carrying hay and straw to the London markets, and for bringing dung and other manures back; they are drawn by four horses in the winter six months, and by three for the rest of the year. Beyond that distance, and to the extent of the county, various sized small carts are used of the following dimensions; 3 feet 7½ inches broad behind, 3 feet 4 inches before, 4 feet 4 inches long in the body, 1 foot 8 inches deep in front, 1 foot 1 inch behind, 5 feet 4 inches long in the shafts, the wheels nine inches broad for arable, and sometimes 14 inches broad for pasture, and four feet diameter, they are always shod with iron; such a cart cost me six pounds. Other carts are 5 feet 6 inches long, 20 inches deep in front, 14 inches deep behind, four feet broad behind, and 3 feet 8 inches before; the wheels and shafts much the same as to the preceding cart. This will cost £7 7s.; each of these carts are drawn by two horses.

Respecting the single horse carts, I have had frequent opportunities of examining their alleged

leged merits; I have also made it my particular study to canvass the opinions of men of great weight, and of much more practical experience than myself, as well in this county as in others, and they are uniform in their condemnation of them. In the first place, they assign a very strong argument against them, which is, that those persons, who have been most lavish in their recommendation of them, are the very men who now disuse them, which they say can only arise from the experience they have had of their inefficiency. But they argue the point upon equally solid grounds, and maintain that upon level ground only, four single horse carts will draw more weight for a short distance and a short time than four horses in a proper sized waggon with its fore and hind ladders, but if the road is hilly, and the distance considerable, the waggon will carry the greater weight of goods with less fatigue to the horses, and in a shorter time. In going through London, or through any large town, these single horse carts require a driver to each, when in fact one man is sufficient for any narrow wheel waggon, although a boy is generally added in case of an accident. In going up hill a single horse becomes more strained with the exertion than two horses would be with double the weight, because they know how to ease one another, and are observed to do so, whereas a single horse has no such resource; again, horses work with greater spirit and less fatigue in company than when single, in the same manner as any man will walk a distance in company with more pleasure and less fatigue than when alone. It is exactly the same in all sorts of laborious manual operations, it is almost com-

pany alone that will make a man go through great bodily exertion which he would find difficulty in accomplishing by himself.

#### WAGGONS

Are of various dimensions according to the purposes for which they are designed, those which travel the road daily and are employed sometimes to carry corn, at others coals, stone, fullers earth, lime, dung, and other ponderous articles, are made peculiarly strong, and are larger than those which are confined to the use of the farmer. With such people as the latter, the size and dimensions vary so little throughout the county, that one description may suffice.

The fore wheels are 4 feet 2 inches, the hind wheels 5 feet 5 inches diameter; the extreme length of the body 12 feet; the width of the fore part 3 feet; the width of the hind part 3 feet 9 inches; the middle or lock 2 feet 2 inches; the mean depth 1 foot 6 inches.

The fellies are made of elm, the spokes and axle-tree of oak; the ribs and the body of elm, ash, or beech, but generally of the two former; if the waggon has iron arms, with ladders, &c. complete, they will cost about thirty guineas, but with wooden ones about 25 pounds. The one that Mr. Simmons, before-mentioned, made for me at the time he made the turnwrest plough, and which had only wooden arms, came to the enormous sum of £37. 11s. but it was so strong, and every part of the work was so well put together, and of such seasoned materials, that it will, with fair usage, last out almost any two; the boards were secured to the



ribs by strong wires twisted round them instead of having nails drove through them; consequently they were not cracked or weakened as they usually are when nails are driven through them.

Some gentlemen farmers are possessed of horse rakes, which they use in harvest time for collecting together the loose barley or oats that may not have been clean taken up, they have iron teeth about 12 or 14 inches long, and from four to five inches asunder, which are let into a head or frame, they are generally from ten to twelve feet long, and are made of oak. They have a beam affixed to them, which is nearly four inches square, they are drawn by one light horse, which is guided by the man who walks behind the rake to lift it up as often as it is filled with corn. The expence of the one I saw at work was 30s.

#### THRASHING MACHINES.

These instruments are increasing very fast in different parts of the county, but in particular round Guildford and Godalming. I have only met with two in the eastern part, the one at Mount Nod farm, near Streatham, and the other at the farm lately occupied by Mr. Quarterman, in the parish of Godstone, which, either from some defect in the materials, or from some mismanagement on the part of the people employed to attend to the working of it, had used to be frequently so much out of order as in fact to be a serious loss to him in point of expence in repairs, but as stopping the work, the loss may be almost irreparable, because at such a period men are not to be got without paying large prices for their work, in consequence of their

dislike of the machine, and who will take every advantage upon those occasions, well knowing that their services at such a period cannot be dispensed with; but when properly constructed and regularly attended to, they are of immense advantage upon a large farm, as was proved to be the case here, for at the period of the great scarcity of wheat, in the year 1801, when wheat was selling at £50 a load, his crop of new wheat, got in early, was very large and fine, and his machine gave him an opportunity of availing himself of this scarcity by selling the greater part of his crop at prices between £30 and £45 per load, when other farmers by the usual mode of thrashing could only take a load or two to market per week, while he was able through the means of this machine, to sell 30 or 40 within the same time. Mr. Woodroffe, who now occupies the farm, and possesses the machine, tells me it is so badly constructed, that to alter it would cost nearly the expence of a new one.

Mr. Birkbeck, of Warnborough, has a very capital machine of this kind, worked by four stout horses, which is found very laborious, and in the opinion of the men is equal to the power of six horses at fair moderate work. Mr. Birkbeck had the goodness to shew me the whole machinery, but it must be confessed that the expence of the erections necessary for so large a machine, and the quantity of room which the whole occupies, is only fit for the landed proprietor, or capital farmer in the possession of a long lease; his extensive concerns, with the fortunate situation of his barns fully justified him in erecting such a machine, which for thrashing wheat, beans, and pease, he

of Scripture, it will be only necessary to refer them to that remarkable passage in the book of Deut. chap. xxv. verse 4. wherein it says, "Thou shalt not muzzle the ox that treadeth out the corn." From which we are given to understand that the practice of the ancient inhabitants of Asia, and Egypt, the Hebrews, was to inclose a spot in the open air, to smooth it with clay, which was afterwards rolled hard, so as to form a floor, which might be called the thrashing floor. The corn was then spread in sheaves, two or four oxen were yoked together, then turned in and kept in motion until the corn was separated; this was called *tritura* and *trituriatio*, grinding and thrashing: this practice was in use at Adrianople in 1717; vide Lady Worsley Montague's Letters to Mr. Pope, fol. 99, wherein she says, "the corn being all trod out by oxen." After this we read of machines made of planks and beams, stuck over with hard pegs and flints, between which the ears of corn were rubbed to separate them; and trail carts or tumbrils, (as Dryden expresses it) were used by others to bruize out the grain by their weight:

Virgil, in his description of them, thus says

"Dicendum et quæ sint duris agrestibus arma

"Tribula, trabæque, et iniquo pondere rastri.

which Dryden thus translates, but very erroneously in my opinion:

"The sled, the tumbril, hurdles, and the flail.

Whence he procures the hurdles and the flail in the original text I am at a loss to find out; *tribula* may be construed as the tumbril; *trabæ* signifies beams or planks, which may form the sled, but *rastri*, according to Terentius Varro in his books of

husbandry, implies rakes, harrows, or drags; and though by any forced construction hurdle, for which crates is the proper and usual term, might be substituted for drag, (which Juvenal does not at all admit, for the Athenians, who always used hurdles at sieges, called them *πίπρα*, and the Latins crates, which signifies wicker hurdles) we want still something to give us an idea that flail is meant by *agrestibus arma*, which, if I understand the phrase right, may mean all sorts of husbandry tools, but certainly not flails in particular. I only state this to shew that even our greatest authors are not always the most correct in their translations.

At what period the flail was introduced, instead of these awkward machines, does not seem to be noticed by any of our old authors; we frequently meet with the words *flagellum*, and *flagello*, the former signifying a whip, the second to scourge or to thresh, and *flagellator* as well as *triturator* is used for thrasher, or as we call it, thrasher, but *flagellator annonæ* signifies also an engrosser of corn; the context therefore must always be attended to. From the former word *flagellum* I apprehend the word flail to be derived. But none of these terms furnishes us with the least information as to whom the invention is due. Be this as it may, it could not but be obvious to many an intelligent farmer, that the flail was an instrument, slow in its operation, by no means accurate in his execution, because altogether dependant upon the voluntary exertions and care of the thrasher, and where a great deal of corn was grown upon any particular farm, such corn would require a great length of time to thrash out, to say nothing of the extent of buildings

which would be required, if a number of people were to be employed to make up for the tediousness of the flail; the opportunity for dissipation to be committed by the thrashers, by such unavoidable delay, was not the least important part of the consideration; to counteract therefore these accumulated evils, the ingenuity of many intelligent men was set to work, and to this cause we are to account for the origin of these machines, which took place about fifty years ago. The first attempt in Britain was made by a Mr. Menzies of East Lothian, who invented a machine to go by water, upon the principle of driving a number of flails by a water wheel, but from the force with which they were wrought, the flails were soon broken to pieces, and consequently the invention did not succeed.

About the year 1758 Mr. Michael Stirling of Dumblain in Perthshire, an ingenious farmer, invented another thrashing machine, similar to the common mill for dressing flax, which was also worked by water; it had a vertical shaft with four cross arms inclosed in a cylindrical case 3 feet 6 inches high, and eight feet diameter; within this case, the shaft with its arms was turned with considerable velocity by a water wheel, and the sheaves of corn being let down gradually, through an opening for the purpose on the top of the box, the grain was beat off by the arms, and pressed with the straw through an opening in the floor, from which it was separated by riddles shaken by the mill, and then cleared by farmers, also turned by it. The great defect of this machine was, that it broke off the ears of barley, or wheat, instead of beating out the grain, and was only fit for oats,

Several other machines were afterwards invented by different persons for accomplishing this important operation, but none of them answered the purpose till one was constructed by Mr. Andrew Meikle at Houston Mill, near Haddington, Scotland, whose family possess a kind of hereditary right to genius and invention.

Mr. Meikle, who for several years had been attempting to bring these machines to perfection, ascertained that they had all been constructed upon wrong principles, and that beating must be had recourse to instead of rubbing, otherwise the work could not be performed in a sufficient manner. He therefore, in 1785, made a working model, turned by water at Know-Mill, in which the grain was beat out by the drum, after passing through two plain rollers, which were afterwards altered for two fluted ones.

Mr. George Meikle, son of the former, being at Kilbegie, the residence of Mr. Stein, agreed to erect one for that gentleman which was completed in 1786.

It was found to work exceedingly well, and the only alteration made from the above mentioned model was, that instead of plain rollers, fluted ones were substituted. Since the erection of this machine Mr. Meikle has progressively introduced a variety of improvements, all tending to simplify the labour, and augment the quantity of work thereby performed.

When first erected, though the corn was equally well separated from the straw, yet, as the whole of the straw, chaff and corn, were indiscriminately

thrown into a confused heap, the work could only with propriety be considered as half executed.

By the addition of rakes or shakers, and two pair of fanners all done by the same machinery, the different processes of thrashing, shaking, and winnowing, are now all at once performed, and the corn immediately prepared for public market.

When I add, that the quantity of corn gained from the superior powers of the machine is fully equal to a twentieth part of the crop, and that, in some cases, the expence of thrashing and shearing the corn is considerably less than what was formerly paid for shearing it alone, the immense savings arising from the invention will at once be seen.

Where farms are of small size, it would be improper to recommend the erection of small machines, as the interest of the original purchase would be a heavy drawback from the advantages; but, under contrary circumstances, I am decidedly of opinion, that a machine of great powers, provided with two rakes or shakers, and two pair of fanners, is the most profitable one for the possessor. A horse machine of the greatest powers, with the appendages of rakes and fanners, may be erected for £100, and when wrought by wind for £200, independent of the buildings and fixtures which are required.

It would be unfair, however, to charge these to the amount of the thrashing machine, as even upon a middle sized farm a greater extent of building is required for barn work, when the corn is separated from the straw by the flail, than when the operation is performed by the thrashing machine.

From the most minute attention bestowed on this subject, I am confident an extra quantity of corn,

equal, in ordinary years, to £5 per cent, some go so far as to say equal to £10 per cent upon the whole produce of the farm, in some cases to one shilling a bushel on wheat, and generally to twenty shillings per acre on the whole wheat crop, will be given by the thrashing machine more than by the flail; besides innumerable other advantages which accompany that machine. Indeed the loss by the flail has long been proverbial, and the best farmers were obliged to submit to losses of this nature, because they could not be remedied; but with the thrashing machine no corn need be lost, as every particle of grain is scutched off, when the machine is constructed upon right principles.

The expence of horse labour, from the increased and increasing value of the animal, and the charge of his keeping being an object of the greatest importance, I beg leave to recommend that upon all sizeable farms, that is to say, where 200 acres, or upwards, of corn, are sown, the machine should be wrought by wind, unless where local circumstances afford the conveniency of water.

Formerly there was great danger attending wind machines by sudden squalls of wind, but that is not the case now; for the whole sails may be taken in or let out in half a minute, as the wind requires, by a person pulling a rope within the house, so that an uniform motion is preserved to the machine, and the danger from those sudden squalls entirely prevented.

Steam may be applied with great advantage, when coals are reasonable, for working the machine.

The quantity of grain thrashed in a given time must depend upon its quality, on the length of the



straw, and upon the number of horses, or strength of wind by which the machine is wrought; but, under favourable circumstances, from 70 to 80 bushels of oats, and from 30 to 50 bushels of wheat may be thrashed and cleaned in one hour; but it is from clean dry grain only that so much will be done in that period.

In a word, the thrashing machine is of the greatest utility to the farmer; and from it the public derives a vast additional quantity of food for man and beast. If five per cent is added to the national produce, it is as great a gain to the public as if the national territories were increased one seventh more than their present size; for this additional produce is gained without any other expence than the money laid out in erecting the machines; no more seed is sown than formerly, nor more labour employed, and these articles have always been estimated as equal to two fifths of the produce.

As a farmer's capital ought never to be laid out in expensive buildings, or works of an extraordinary kind, I am of opinion, that the sums necessary for erecting machines should, in the first instance, be expended by the landlord, and the tenant bound to leave them in a workable condition at his departure; paying also to the landlord an annual rent over and above the usual rent of the farm, of not less than six pounds per cent, for the money so expended, and being bound also to insure the premises: thus all parties would be secure. Many farmers have capitals sufficient for undertakings of this kind, but the great body of that profession would be injured by such an expence, as they would thereby be deprived of the means of improving their farms in

other respects. Besides, as every improvement, at the long run, centers in the pockets of the proprietors, it is but fair and reasonable he should contribute his moiety of the expence laid out in the procuring it; and in many cases he would be benefited, in the first instance, by the erection of thrashing machines; particularly where new farm buildings are to be erected, as fewer of them would of course be wanting.

With respect to the amount of the probable savings which might accrue to the public if thrashing machines were universally used. It is impossible to be accurate. All we propose to offer is some general idea, until facts are more sufficiently ascertained.

The extent of ground, annually employed in Great Britain, in the raising of corn may be computed at seven millions five hundred thousand acres, and the average produce of the different grains at three quarters per acre, as below that increase no farmer can raise it with profit. Mr. Middleton, however states, the whole quantity of land in aration to be 14 millions, of which eight millions four hundred thousand are in corn, and beans; the five million six hundred thousand being in clover, rye, grass, one year's ley, turnips and other roots, and fallow. I think however this quantity is overcharged, as well as that the other is underrated, as will be hereafter shewn.

The produce of three quarters per acre is as nearly however correct as the nature of the subject will admit. According to Sir John Sinclair's hypothesis, he supposed there were only five millions of acres annually employed in raising of grain, but

this must certainly be erroneous; for if the population of the island be ten millions, the produce of these acres would be far below what is required for the support of that number of people, independent of what is necessary for the feeding of horses, and seed for the next crop.

In the reprinted survey of the county of Stafford, is a pretty just calculation of the number of acres annually sown in that county, which amount to one hundred and fifty thousand acres. Now as Stafford is not a corn county, I do not take much latitude when I fix upon it to average the whole counties of England; this would make the total quantity sown in that kingdom amount to six millions of acres. The remaining one million five hundred thousand acres I suppose to be sown in Scotland and Wales, which make their produce only equal to ten English counties.

If seven millions five hundred thousand acres be annually sown in Britain, and the average produce amount to three quarters per acre, then the total quantity of grain annually raised in Britain would be twenty-two millions five hundred thousand quarters.

I have already said, that the thrashing machine, from its superior powers, will give one twentieth more grain than when the operation of thrashing is performed by the flail. This furnishes an increased quantity of one million one hundred and twelve thousand five hundred quarters; which taken at the average price of 32 shillings per quarter, for all grains, amount to £1,781,250; add to this the difference of expence between thrashing with the above machine and the flail, which may be stated at one shilling per quarter, (although when the ma-

chutes are wrought by wind or water, the difference is more than double that sum) this on 22,500,000 quarters is £1,225,000, the whole amounting to £2,906,250.

I scarcely expect to be credited when I say that the above enormous sum would annually be saved to the public, if the whole corn raised in Britain was separated from the straw by these machines, and yet few political calculations will admit of such certain demonstration. Let me only suppose that one-eighth of our corn was thrashed in that way, and still the saving is immense. If any person doubts the principles upon which these calculations are built, I have only to request he would pay strict attention to the subject, and I am pretty confident he will soon acknowledge they are not over-stretched.

The only deduction necessary to be made, is for the interest of the money expended in erecting the machines; the principal sum of which, especially upon large farms, will be repaid by the savings of of three years crops.

One observation is necessary to be made here, which is, that although a great deal more corn will be procured from the straw than can readily be done by the flail to the extent I have no doubt of what is before stated, yet we are not to consider all the corn which may be left in the straw by the usual method of thrashing with the flail as entirely lost, since the much greater part of it, by being thrown about the farm yard, is consumed by pigs and poultry, and is a greater inducement for cattle, whether horses or cows, to feed more readily upon it.

Upon the whole, it may be considered that the invention of this implement is among the greatest improvements that has been introduced into Britain during this age. The toil of human labour is thereby lessened, the stock of agricultural produce is increased, the health of a very numerous class of people employed the greater part of the year in this occupation is preserved: when it is notorious, that by the flail it is considerably impaired, and the facility of managing large concerns is thereby greatly promoted. Could it be so further simplified as that the common mechanics of the country could with ease repair them when they happen to be out of order, the improvement would be vast indeed.

#### WINNOWER MACHINES.

Of these there are several in the county, which are used for cleaning all sorts of grain and small seeds after they are thrashed, for the latter they are more generally used than for the former, because from their minuteness they require somewhat of a different manner of dressing; such are red and white clover, trefoil, turnip, rape, cabbage seeds, &c. these when they cannot be cleaned by the wind will be best cleaned by this machine, one of which I have used for above twenty years. By the regularity of its wind, produced by the quick revolutionary motion of the fan, the chaff, dust, &c. are readily blown away from the seed, which falls immediately down from the hopper into the box, while the chaff, &c. is blown to a distance from it. These machines cost from three to five guineas according to the size of them.

**TURNIP HOE, OR MORE PROPERLY TURNIP CHOPPER.**

The first of these instruments that I had ever seen I met with during this survey upon the farm of a very respectable gentleman, Mr. Street, of Bramley, to whom I had the pleasure of being introduced by my Lord Grantley. This instrument is used by the shepherd for taking up the turnip, and slicing it by one or more strokes into as many divisions, as according to the size of the root, each piece may be sufficiently small either for lambs to take into their mouths, or which is of more immediate consequence, to enable the old toothless ewes to fatten with nearly equal facility that the younger ones do; as they are capable of picking these pieces up, and, by a toss of the head, let them fall into the further part of the mouth to the grinders, by which they are enabled to masticate the root, when they would otherwise find great difficulty in supplying themselves with a sufficiency of food by the usual method of nibbling the turnip either while it is in the ground, or after it is pecked up. The hoe is first made like the common nine-inch garden hoe, forming an oblong square, with an eye to receive the handle; from the centre of the first hoe, another hoe crosses it at right angles, but this second hoe is not made solid as in the first common hoe, but is made like a Dutch hoe, the centre part of it being open the whole length of it. The turnip being pulled out of the ground by the angles of the hoe, is immediately struck with it about the centre, which divides it into four, and if these four pieces are not made small enough, the stroke is repeated upon each of the pieces until

they are sufficiently so. This instrument will be found very useful, but would be greatly improved, in my opinion, by having two stoutish prongs on the back or reverse part of the hoe proceeding from the neck of the eye; these prongs would pull up the roots with infinitely more expedition, and the increased weight of the hoe would rather be in its favour, by lessening the force necessary to split the roots. The whole expence is so trifling, and the simplicity of it is such as greatly to enhance its value.

And if I might appreciate its intrinsic worth by the state and condition of Mr. Street's sheep, both ewes and lambs of all ages, compared with the same sort in the same neighbourhood where they did not make use of this instrument, I might in the language of a very sensible well informed gentleman farmer, Mr. Barrett, of the same parish, say, they as far exceeded those alluded to, as any of the prime South Down flock upon the hills of Sussex exceeded those of a mongrel breed in the same place.

#### WHEAT FRAMES, OR CORN STADLES.

Upon most of the principal farms in the county frames or stadles are to be met with for securing corn from the depredations of rats and mice, before it is thrashed out, as well as for the more beneficial purposes of air, &c. These frames are in general placed on stone pillars either circular, hexagonal, or square, with large caps projecting over them, to prevent either rats or mice, from getting into the stack. Upon these caps a frame of oak, elm, or fir, is laid mortised into each other,

and upon this frame cross pieces are nailed by way of joists, upon which hurdles or faggots are placed, and the corn built upon them; their form is either oblong or circular. To these stadles there is but one objection, which arises from servants putting many of their tools under them in order to keep them dry, through which means rats are sometimes found to have availed themselves of the opportunity of getting into the rick. To remedy this evil the fashion is now to build a wall of solid brickwork from three feet six inches to four feet high, either circular or oblong, and to cope that with stone, coping bricks, or large paving tiles, letting them project at least three inches over the outside of the wall, and the frame work is bedded on the coping. A rick yard properly inclosed, and with all the ricks of corn, pulse, and hay, disposed in regular lines, and placed on these frames, with plenty of room between each rick for air, and gangway for a waggon down the middle of them, has most assuredly a very neat and economic look; but how far the corn may keep as well and free from damps upon these walls as upon the old stone pillars I am not prepared by facts to say; but as far as my opinion goes, I confess I should doubt it much, especially in a wet season; when the ground under these ricks, and within the walls, must have imbibed a great deal of moisture, and must therefore engender damps when the corn is placed over them, because both sun and air is thereby excluded from them. Time however will discover how far my suggestions are well founded.

At General De Lancey's, and at Mr. Currie's,



at Horsley, these walled rick frames have been lately erected.

The expence of the old sort of stone stadles are as follows:—A stone and cap, of which nine are generally used, at 10s. 6d. each, £4. 14s. 6d. Frame work of oak, say 20 feet wide by 22 feet long, materials and labour included, about £9. The same of elm, materials and labour, £6. Fir is so unsettled a price at present as to be no guide for any other period.

#### LADDERS

Are very useful articles about every farm, and such as none can dispense with. The sides are generally made of fir, and the rounds of oak.

The price of them is calculated by the round, which if the whole is painted three times in oil will amount to about 4½d. per round.

#### GRANARIES.

Among the necessary appendages to a farm perhaps none are of greater importance than the buildings I am now alluding to.

It is in vain that we are at great expence in providing ourselves with every useful implement, in order that we may till our land in the most husband-like manner, or in procuring the most beneficial manures, if, after we have secured a return of grain commensurate to all this trouble and expence, we are not provided with such repositories for the reception of the produce, after being made fit for market, as shall keep it in the most perfect state for any length of time we may have occasion to keep it.

When I say perfect state, I mean it to be understood that it is free from vermin, from damp, and from foul air, and that it shall always be perfectly sweet and sound.

If we look back among the sacred writings we shall find that in the time of Jacob, which was above 1800 years before Christ, the Egyptians found it necessary to have public granaries erected in the most central parts of that vast territory which they occupied; and that the greatest attention was paid to the choice of the places where they were erected, in order that the corn therein deposited might be preserved wholesome and sweet, and secure from vermin for any number of years they might have occasion to preserve it. We have nothing of this kind in England, because the uninterrupted state of our agriculture, and the spirit with which it is carried on, not to say any thing of the vast speculations of our merchants to import corn against any prospect of scarcity, renders such an establishment in this country almost unnecessary. But although the government of the country may not feel the necessity for such a public institution, yet it ought to be an object, first of the proprietor of landed property; and secondly of the tenant, that these buildings are so placed and constructed as to be perfectly handy and convenient, yet in no danger from vermin, much less from damp or noxious air.

This being premised, let us see how far these buildings correspond with the precautions I have just stated in the county of Surrey, either among the landed proprietors themselves, or among those of their tenantry. In all the old farm yards we

shall find them placed at one end of a range of sheds, or adjoining to the stables, or taking up a room in the dwelling house; and among the higher class, forming a detached building in the centre of a hollow and damp yard, with a dove cot over it. Sometimes, indeed, they are placed entirely out of the farm yard, but then they are either incumbered with this dove cot, or they have all manner of implements, such as ploughs, harrows, barrows, &c. thrust under them; or hogs, cattle, frequently sheep too have almost constant access to them. If I am correct in my observation, it will follow that in none of these situations can corn be said to be free from some one of these complaints; for if the granary is attached to any building, or if implements of husbandry are suffered to be on any occasion deposited underneath them, it is morally impossible that they can be free from vermin; and if they have once found a way to it, it is not the less accruing from the quantity of grain which they may eat that is so much an object, as the great injury which they also do to the corn by their dung and urine; and, by suffering cats in those places in order to keep them free from vermin, the injury is only lessened as far as respects the vermin; but probably increased as to the injury done to the corn by the propensity which cats have to do all their business among corn and seeds, as I have had many striking proofs of in the course of many years extensive dealing in corn and seeds.

Their urine, as well as that of rats and mice, gives to the corn a most disagreeable smell when fresh done, which is only to be remedied by air, but it retains a sort of clamminess which is very

difficult to be removed. All such corn is apt to sprout, and to occasion thereby a degree of moisture which soon communicates through a large body of it, to the great injury of the entire bulk. In fact such corn will not keep sweet nor sound, and will be daily getting worse.

In order therefore that we may be able to keep our corn in the highest possible condition for any length of time, we must build our granary, first, in the most airy situation we can find, and secondly, in the driest place, and which ought to be so elevated, as that the water may run from it freely, and in every direction if possible; and it will add greatly to its dryness if the ground underneath the granary is made solid with chalk, and completed round about it either with free gravel or sand.

Granaries, in the opinion of some very eminent corn merchants on Bank-side, in the Borough of Southwark, ought to be constructed wholly of wood, with an inside coating of sound plastering, the ceiling or roof lofty and airy, but perfectly close, the windows of glass, with a frame grated with fine wire to admit air whenever required, and to keep out birds and larger insects, the floor to be double laid with sound fir or oak, tongued and as close jointed as possible, to keep out insects and air; others strongly recommend them to be built with sound malm stocks, or any dry hard brick that does not abound with nitrous particles, the mortar to be made of the best stone lime, and mixed up with the dryest sand, but road scrapings that is produced from the gravel of flints, and that is free from clay or loam is the best. The walls to be not less than 14 inches thick, the inside of which to

have a false lining with lath and plaster, close of the wall at least three inches; the plastering to be made in the nature of stucco with the hardest stucco lime, and laid on as hot as possible, in order that it may set hard and dry. But no loam must be mixed with it, for that will cause the best plaster or stucco in the world to give and become moist at every change of the weather.

The roof to be ceiled, and the outside covering should be with sound plain tiles, closely bedded in mortar, and on no account to erect dove cots upon the top of it. To make such a granary complete, it should have a flue all round it, at about three or four feet high from the floor, in the same manner as in a hot-house, to which, a short pipe closely fitted in should communicate from a well constructed Buzaglo, or German stove, which should be heated in damp weather; and also whenever, the corn is shifted about and turned over, a thermometer should be so properly suspended in the room that the true temperature of it may be clearly ascertained, and whenever it is heated, it should be kept up between 190 to 212 degrees of Fahrenheit's scale, this heat will not only dry the corn, but will effectually destroy all the variety of papilio or corn butterflies, the curculio or weevils, as well as the tinea (which are sometimes called corn worms, but which are by no means peculiar to corn; as the seeds of gramineous, as well as of bulbous and tuberous rooted plants, such for example as rye grass, clover, turnip, rape, cabbages, carrots and parsnips, are equally attacked and destroyed by them, especially if the seed is not thoroughly dry) but should the heat be found sufficient to

to destroy these insects, a proper application of Philip's genuine powder, will, I am persuaded do it effectually, and no injury whatever will be done to the corn, as I have kept seeds free from them by the use of this powder for years.

When the corn has been got in dry and well, there is but little difficulty in keeping it; but as it must in all probability be laid of some thickness on the floor, it will from the quantity and the natural moisture of it soon heat, it should therefore be felt every day, and at the furthest in 14 days, if it has not before heated, it should be turned over on a dry day, and the windows be opened, the dust will then find its way out, and the air will pass through the corn, and check its heating. Thus shifting it and turning it every fortnight or three weeks, for five or six months, the heated air, as well as every impurity, will be dispersed; the corn will continue for years sound and sweet, without running any risk of again heating, it will handle well, and be found to grind as well as one year old corn of the same original quality.

But corn got in in a damp season must not only be often dried by the heat of the fire, but will require more frequent shifting, and the air to be admitted to it as often as possible; for the great object with such corn is to endeavour to exhale all its fiery particles, without injuring or lessening either the taste or the quantity of the farina, or even the pure and natural smell of it, and to give it such a degree of hardness or consistence as to prevent its heating in future in almost any bulk into which it may be thrown.

It may not be amiss to remark, that such gra-

naries should have outside shutters, and a second door to keep it more close, which either in wet or frosty weather, when there is no fire at work, should be kept close shut; and it should be particularly remarked from time to time, whether the corn which is thrown up against the wall contracts either damp or smell, in order that proper measures may be taken to have it remedied in time.

We read in the elder Pliny, in his very extensive Treatises on Natural History, that corn which is kept in caves and piles will keep sound and sweet for upwards of 100 years; the country where such pits and caves were made, and to which he alludes, was Italy. These caves were particularly selected from the driest spots, were cut out of sand or rocks, where no damp could arise, and they were constantly kept close shut up, so that no air could get within them. The cave or pit having been cut perfectly smooth within side, or made so by a coating of their incomparable plaster, a body of the driest chaff was laid on the floor, and then the corn was laid upon that, until the place was nearly full, when more dry chaff was laid on the top so as to cover the body effectually; if it was a pit the mouth was covered with planks, and on them dry earth for a considerable thickness, and in this condition it was left for future use.

Powdered chalk was also made use of to mix with the corn, which by imbibing the moisture occasioned by the sweating of the corn prevented its heating, and kept it also free from insects. This practice might be adopted in this country with a prospect of great success, but then the chalk should be first analyzed, to see that no earthy salts are

combined with it, otherwise it will be subject to give upon the change of weather, which will more or less affect the corn. Lime, in a pulverized state, would by no means answer, because the damp which might arise would soon cause it to slake, and it would evidently burn the corn.

I am not prepared to say how many years corn will keep in either of these ways in a state of vegetation, having never tried it, nor have I been able to find any passage, properly authenticated, either among the ancient or modern authors, that furnish any sufficient data to judge of it, it would not be prudent therefore in me to venture an opinion.

With respect to the housing of several articles of the pulse or leguminous tribe, such as beans, late peas, tares, &c. it will often happen that they are mowed when some of them are perfectly ripe, while others are yet green, in which case, unless they are kept in the haulm for a great length of time, it must be expected that they will sweat and heat prodigiously, if they are laid of any thickness on the floor, and will very soon be spoiled. The advantage of flues and a fire in a granary in such a case cannot be questioned, and will prove infinitely better than the usual way of kiln drying; which not only causes the seeds to shrivel up very much, but eventually takes from them every faculty of vegetation. Such articles, however, will require more attention in shifting about and turning over, more frequent repetition of it, and more air than need be given to the same seeds more thoroughly and evenly ripened, as well as to gramineous seeds.

Beans I know from experience will keep their colour, and retain their bulk and sweetness for a



great many years, by being kept in an oil cask that has been completely saturated therewith, the hoops kept so tight as to admit of no external air; the inside must be rubbed over with sifted wood ashes so as to form a coat; the beans to be thoroughly ripe before they are gathered, and kept in the pods to March or April, then to fill up the cask as full as it will hold, the beans well and close pressed down, and covered with a close strong head, to be afterwards kept dry and cool.

A well tarred barrel, made of good sound oak, strongly bound, properly headed down, will keep either beans, peas, tares or lentils perfectly sound and sweet for several years.

#### FALLOWING

Was almost universally adopted throughout the county until within a few years; whatever might have been the nature of the soil, it is now however so much departed from by the more enlightened farmers, that with them the absolute fallow of winter and summer is only resorted to on particular occasions, but as the middling, and particularly the small farmers, do continue the practice, it becomes necessary that the mode of doing it should be here represented. Fallowing, therefore, is of two kinds, viz. winter and summer fallowing for wheat, and winter and spring fallowing for turnips, barley, &c. I shall first shew in what manner each is performed in the various parts of the county, and afterwards submit some reflections which have proceeded from a due consideration of the subject.

Fallowing was formerly a constant preparative for rye, that is, it was sown after three or four good

ploughings and as many harrowings, now it is as often sown upon once ploughing of the etch or stubble, unless the land is very foul, and then it is not very usual to sow rye. For wheat, when the land happens to be full of couch, thistles, black bent, charlock, poppy, cockle, coltsfoot, rest harrow, and such trumpery, and if a strong loam, the best fallowing I have met with is thus performed, to plough up the etch, as soon as the corn is carried, shallow, and let it lay for six weeks, then harrow it down with the ox harrows, tearing it about as much as possible; if it will not admit of the small harrows on account of the clods being large and solid, it is usually rolled, sometimes with a spike roller, the harrows are then applied, and all the weeds and rubbish that can be picked off are burned, and the ashes spread; it is then deep ploughed either across or diagonally, and left as rough as possible; the frost and snow will shake it in pieces, and prepare it for pulverization with the harrows as soon as the weather permits, which occasion is always eagerly seized, the weeds are again collected and burned, and the land immediately ploughed; if it was not done sufficiently deep the last time they never fail of letting it be so now; and at this time it is ploughed up and down and left rather rough, until the busy time of Lent sowing is over, it is then harrowed down and left rather smooth, and well cleaned, and the weeds burned; if it is to be manured with dung, lime, or chalk, it is then brought on the land, immediately spread, and the ground shallow ploughed across, and thus left until sowing time; but with some more nice men it has another ploughing to mix the manure more intimately with

the soil; but with the generality of farmers, especially the small ones, the fallow is seldom composed of more than three ploughings, not always, nay, but seldom harrowed between each ploughing, and as seldom cleared of the weeds that are collected, which are suffered to run the chance of perishing on the surface. By not harrowing the ground between each ploughing, (and that should never be neglected when it will harrow well,) the ground is never pulverized, the clods are turned over it is true, but the weeds are not destroyed, nor does the land receive those nitrous particles in the same proportion as it would do if it were pulverized and made fine. The spring fallowing upon the same sort of lands consists of one ploughing before Christmas by some farmers, and two after Christmas, but generally of two ploughings for barley or oats, and of three for turnips, rape, or tares; if intended for cabbages or tankard turnips the land has an additional ploughing, two of them are made deep. Every intelligent farmer admits the propriety of frequently stirring the ground during the period of fallowing, whether it be clean or foul, for which purpose the instrument called the nine share is admirably adapted, for besides going a depth of 15 to 18 inches, loosening all the soil between the shares as it goes, it brings to the surface the weeds, and it gets over no less than eight acres per day with the strength of six horses and one man. A more particular description of this instrument will be found in the account of the implements of husbandry. In the sandy districts the practice varies from that of the loams, and varies as much among the farmers in the same district; some being of opinion that

ploughing the lands before Christmas, and even at any time, is very bad policy, as tending to make that lighter which is perhaps already too much so; while on the other hand the argument is, that the oftener it is exposed and turned over it becomes the more sweetened and the more recruited, and if it is found to lighten it, that may be easily corrected by driving a flock of sheep over it at stated periods, and compressing it as well as dressing it, and by rolling also. It is become a custom to fold the sheep in the summer at night on some of the fallows, instead of dressing the whole of them with manure, this begins as soon as the land is dry enough, after the turnips are off, and during their range upon the downs, or upon the common; some again fold their sheep by day upon rye or tares, and by night upon the fallows. In working these fallows among the small inclosures of Lindfield, Horne, Burstow, Horley, Charlwood, Meastham, Chaldom, Awford, Ockley, Ewhurst, Cranley, &c. it is really astonishing to see with what particular caution the ploughman turns up the soil, let the subsoil be what it may: since the days of Noah I will venture to say, that nine tenths of all such lands has never had one inch of that subsoil taken up by the plough, and that by having only a certain uniform depth loosened and turned over the bottom of these furrows are become so bound and united as to form a solid body in the same manner as it would be if it had been puddled (to use the canal maker's phrase) and made impervious to water. Almost the whole of the lands in these parishes consist of loams of various gradations of stiffness, and with their subsoils as different; now

the reason assigned to me uniformly (as if by agreement, as well by masters as by servants,) why the plough should not go deeper, and by that means bring up any part of the bottom soil is, that the upper soil is already stiff enough, and in many places too stiff, and that by bringing up the bottom soil the whole would be made stiffer; and in many places where the subsoil is a yellow clay or a blue clay resembling marl or white clay upon a sand stone, such soil mixed with the surface soil would be inevitable destruction to it, and as a proof of it, they say, that such soils are sure to bring in their train tussilago and black bents, and other plants that are always indicative of an impoverished soil. I am very ready to subscribe to the assertion, that the addition of such soil to the surface will produce the effect which they ascribe to it, if it is afterwards cultivated in the old way; but I am very far from yielding to the conclusions which they draw from it, "that such soils are not to be corrected at the distance which they are from manure, but at an expence which either the land or their pocket cannot bear." I am so far from admitting this as a principle, that I am convinced they are daily standing in their own light, while they are maintaining such doctrine. In the first place, if we examine the condition of the land, it will be found to be exactly in this state, that being never ploughed deeper than four or five inches perpendicular, and the bottom becoming thereby (as I have before stated) perfectly water tight, the roots of the wheat are kept, all through the winter, in a state of stagnation, and always so in a dripping summer, by the continued moisture which is retained in that body of soil; to counteract

in one way the loss which is sure to follow from this superabundant moisture, the farmer wisely sows an additional peck, or half a bushel, or a whole bushel of seed per acre, that the plants may be so much the thicker on the ground as to allow for the numbers that he expects will die off in the course of the winter and spring; as the season advances the coldness of this soil prevents the plants from starting at the same time that others do upon more genial soils; the drying winds of March and April, not only serve to keep vegetation back, but tend to consolidate this body of soil, and to make it crack in all directions; so that when the sun begins to obtain greater power the plants have not sufficiently covered the ground to prevent its effects from drying up the surface, making the soil by that means a hard lump, nearly impenetrable to the plough, and how much more so to the tender and delicate roots of corn; that this is the case with all such lands may presently be seen; let a pot be filled with soil of the description here related, without any hole at the bottom, plant therein a corn or two of wheat, barley, or other grain, let it be exposed to the weather in the same manner as if it had been sown in the natural ground, and its effects from time to time will be just such as I have described; and as proof that all such soils do get so hard, let any man try to plough it up as soon as the corn is carried, if the season has been in the early part wet, and the latter very dry, and I will venture to affirm, that it will be impossible to do it, in any form, without great strength, and without repeatedly breaking the strongest ploughs; if therefore, such is the case, with all such soils, yielding so little produce

as they do in the most favourable seasons; let us endeavour to remove the objection to deep ploughing, by pointing out first how it is to be done; secondly, that it is more necessary to plough deep in wet and strong soils than in those of a more kindly loam; thirdly, by proving chemically that those subsoils, if they do not contain iron, copper, or sulphur, are not injurious to vegetation, when properly treated, but increase the quantity of fresh vegetable matter for all sorts of plants; and lastly, by proving from facts which will be referred to, that all soils which do not contain iron, copper, or sulphur, are fine subjects for vegetation; and whether they do contain any of these noxious particles may be readily found by applying lime to it, which by attracting the acid, will let go the iron, &c. which becoming solid in a heap, can do no harm to the land. It may be objected, that the not having a hole at the bottom of the pot, is no fair experiment; to which I say, that the soils I have alluded to, and the manner of their being ploughed, is an exact comparison, for as the wet cannot pass through the hardness and compactness of the soil, it is much the same as if it was confined in a pot or bowl. And first, when it is intended to plough land deep, if it is clean, the first ploughing of this fallow should take up at least one inch of the fresh soil; I will suppose this time to be the beginning of October, and in dry weather; in five or six weeks this must be harrowed down, first, with ox harrows, and then with the small harrows, tearing it and separating it as much as possible; when this is done, it should be immediately ploughed across, and another two inches of soil brought up; this

must be laid as rough or as sharp as possible, that the greater surface may be exposed to the action of the frost and weather; frost, by the expansive power of the crystallization of the water, breaks down the masses which form in stiff soils; if the weather is severe about Christmas, it will shake and crumble, and pulverize both the fresh soil as well as the old. As it often happens that the surface of the ground is sufficiently acted upon by a warm sun to allow of the harrows working partially in the interval of the frost, that is a good time to use them, for besides tearing asunder a part of the furrows, especially that side which has been most affected by the sun, it exposes a fresh surface to it, so that by attending to this trifling circumstance, at a time when nothing else can scarcely be done, the whole land will by the time the frost is out of the ground be brought down level; then put in the ox harrows, and stir it well about, or the nine share plough, which is the better instrument, and the new and the old soil will be well mixed, it should then have another ploughing up and down, taking up an inch more soil, which is to be laid up sharp, and remaining so for six weeks, at which time it should be harrowed down, and well mixed together, first with the ox and then with the smaller harrows; at this time I would recommend 150 bushels of good quick lime, properly prepared, according as I have described it under the article of lime, or if lime cannot be procured, nor good sand, I should take the head lands round the field as far as might be necessary, lay it in heaps and burn it; when thus calcined, and laid on at the rate of 200 to 250 bushels, according to the quality of the soil, immediately



spread, it should be ploughed in directly, with a shallow furrow; clay thus burned, will in the first place correct the coldness, and absorb the acidities of the soil; but secondly, it will separate and divide the cohesiveness of it most effectually, and make it looser and more free; this may be done at an expence of less than 3*d.* per bushel, and will be the means of making the land more dry, by lowering the head lands; in six weeks more this land should be cross ploughed deeper than the last time, after having been previously well harrowed, and remain so for other six weeks, again harrowed, and afterwards ploughed and left for sowing. All these harrowings and ploughings not only keep the land clean, but first completely mix the new and old soil together, and next incorporate more intimately the lime or burned clay, or whatever corrective is applied with those soils; they sweeten the soil by exposing so often a fresh surface to the air, and they are the causes of its imbibing the carbonic acid to a much greater extent. It may be objected again, that I have increased the number of ploughings, &c. and consequently added not only an increase of labour, but an increase of expence; to this I answer, that if land is to be fallowed it should be done properly, or not at all; it should be kept so repeatedly moving and stirring about as never to let the land get dry below an inch or two of the surface, by which means it always works well, and gets mellow; it is always then in a fit state to receive the seed, be the season wet or dry; let the fallow be what it may, and of what soil soever, I contend that it cannot be stirred too often, if it is expected to derive any advantage from the atmosphere; but, on no account,

would I work this soil which is thus undergoing a chemical process in wet weather, because it is not good husbandry to do that in almost any soil; much less while we are preparing a new soil as it were upon an old foundation. Secondly, that it is more necessary to plough deep in wet and strong soils, be the substratum what it may, than in those of a more kindly loam. I have in the preceding paragraph attempted to prove, and I trust with some degree of satisfaction, in what manner deep ploughing is to be done, and the soil prepared in a masterly manner for vegetation; I shall now endeavour to shew, why it is more proper to plough deep in strong and wet lands than in loams of a more kind nature; in the strong and wet lands therefore, such as do not abound in springs, but are affected by the tenacity of the soil retaining all the surface water, we have first to make the land dry by draining; secondly, to make it friable by ploughing; thirdly, to make it fertile by manuring and dressing; fourthly, to keep it clean by weeding; in these consist the great desiderata of farming. It is evident, therefore, that if the land is wet from surface waters, the further those waters are removed from the roots of the plants, the more likely will those plants be to flourish, and vice versa. Now how is that to be done but by ploughing and keeping the soil open and loose to a considerable depth, to permit the water to percolate through, and get out of the reach of the roots of the most luxuriant plants; in the more kindly and genial soils, whose depths may be two or three or more feet, it is manifest from every day's experience, that those soils do not retain a superabundant quantity of

moisture, so as to saturate at any time, owing to the great portion of silex or siliceous earth with which those soils abound, which permits the water to pass quickly away, and is never so hard and compact as to prevent the roots of the corn from penetrating below the usual depth of ploughing. I am aware, that my doctrine is in opposition to every day's practice, which is certainly to shallow plough upon strong soils, and to deep plough upon the lighter ones, but every day's experience convinces me that my position is right, as founded on reason, and in the immutable laws of vegetation; and consequently, that this practice, although sanctioned by age, is, like many others in the same science, founded on erroneous principles, and ought to be rectified.

Thirdly, I shall endeavour to prove chemically that those subsoils if they do not contain iron, copper, or sulphur, are not injurious to vegetation, but increase the quantity of fresh vegetable matter for all sorts of plants. Whatever may be the component parts of the subsoil that is to be brought up, if it is free from those poisonous substances which I have just stated, they are to be readily acted upon by some one of the many species of alteratives which are now well known, and with whose properties we are perfectly acquainted. Every earth then (with the same exceptions as before) by being brought into contact with the air, is immediately placed in a situation to be acted upon, in order to be purified of its crudities and its acidities; although perhaps, during the first process of this decomposition, vegetation may not thrive so well in it as when it has arrived at a greater degree of maturity, still it is that sort of vegetable food that may be

made (by as simple a process as that which will improve the original soil) highly nutritive. There is a greater body of soil to receive, as well as to impart, the necessary nourishment to the roots of the plant, than when it was in its shallow state; and consequently as the capability is so much greater, so much the plant derives advantages in proportion, and the greater the body containing vegetable food, the longer it will be in exhausting, and vice versa. I have said that this subsoil is ready to be acted upon as soon as it comes into contact with the air. Soil is composed of certain portions of siliceous, calcareous, magnesia, and argillaceous earths.—Now in proportion as the siliceous bears to the argillaceous earths, so will this soil be sooner or later decomposed; if the siliceous is in any great proportion, it will presently loosen the cohesiveness of the argil, and in course will be sooner ready and prepared to receive the carbonic acid, as well as the roots of the plant; if any calcareous earths, as marles, limes, or shells are added to this subsoil, they immediately begin to decompose the acid of the argil, as well as the magnesia, and to discharge all poisonous substances, whether of iron, copper, or sulphur; mucilage is created in much greater abundance, in consequence of this addition of fresh soil, and consequently upon every principle of fair reasoning, amounting to proof positive, vegetation must be so far greatly benefited by the alteration. And

Lastly, I will shew from facts which can readily be referred to, and therefore indisputable, that any sort of soil, even the strongest clays, when first broke up, are not obnoxious to vegetation, provided

they contain neither iron, copper, nor sulphur, and it is a reason commonly assigned for not ploughing deep, in strong soils, such as are denominated clays, that by bringing up such an addition of poor hungry adhesive soil, you increase the defect that before belonged to the soil, and therefore it must be impolitic; but as facts are stronger than any argument, I will take the liberty of stating them, although they will lead me into a detail of some length, but they cannot be too clearly stated, and therefore I hope I shall stand excused. Upon part of an estate at Camberwell, in this county, belonging to Joseph Windham, Esq. which was taken to build on by Samuel Robinson, Esq. of Albion-street, Blackfriars-road, the surface soil had for many years undergone a routine of farming gardening: it was then under lease to Mr. Emmet, but during the latter part of his term, he had suffered the land to run out, and to get most insufferably foul; the subsoil was a strong clay, too stubborn every where even to make bricks, without a great addition of what is termed breeze (that is sifted cinders) to make it work. As the greater part of the ground was to be formed into pleasure and kitchen gardens, with the exception of such as lay at a greater distance from the house, he applied to me to undertake it for him; upon examining the soil, I soon perceived that it was a task of some difficulty, for upon analyzing several pieces of it at various depths, I found it to consist of 282 parts of argil or clay, 28 of sillex or sand, 98 water, 75 calcareous earth, and 2 mucilage in 400 grains. Now in this proportion there is 62 grains, or about one-sixth more of argil than what is considered to

compacted good soil; the situation and formation of this land was such, that the kitchen garden could no where be placed but at the back front of the house; and as the land declined very rapidly, I proposed to sink the ground for it so low, as that it should be scarce seen from it, bringing it at the same time more to a level; and with the ground that was taken out we were enabled to make the lawn also more level; we begun at the further distance from the house to trench the ground, and as we advanced every trench, we went so many inches deeper, that by the time we got to the top of the garden nearest the house, we found ourselves six feet below the old surface, having wheeled away three feet upon the average of the whole length of the garden of solid clay, very free from stones, but so cohesive, that without constantly applying water to the spades, it would not separate from them; the deeper we went the stronger was the soil; and it made so much noise in the neighbourhood, as to bring many gentlemen and their gardeners to see it, who one and all condemned it, adding that nothing could grow in it, and this coming to the ears of Mr. Robinson, and Mr. Favell, for whom I was also concerned, and whose land I was serving the same, they frequently desired me to go no further with it; but engaging to guarantee against all the consequences, even by bringing in a body of good soil that should cover the garden three feet deep, at my own expence, if it did not succeed, they permitted me to proceed. As we begun pretty forward in the autumn I had the trenches laid up very sharp and rough; the frost proving very intense and severe about Christmas, it took deep hold of the soil,

which it shook very much; and as the sun melted the snow on the south side of the trenches, and by their action together dissolved as it were the soil on that side, I had it carefully scraped down several times every day, by which means I found it to pulverize much faster; I seized the intervals of a sudden thaw to lay it all down level, breaking it in pieces as well as we could; when level I immediately laid on as many coal ashes as covered it, over about four inches thick, it was then single trenched, that is one spade deep, and laid up the reverse way, that is north and south; the frost set in again equally severe with more snow, which softened and loosened the soil; before the frost went away, we laid the ground down again, mixing it as well as we could, and added all over it another coat of coal ashes about three inches thick, we then single trenched it diagonally, and did nothing further with it until the frost was entirely gone; as much of it as was wanted for sowing and for planting was laid down, well mixed together, and immediately sown with peas, beans, and various smaller seeds, as onions, lettuces, raddishes, cabbages; but so stubborn and adhesive was the soil that we could scarcely draw drills, and it was not to be supposed that we could cover the small seeds properly with such soil, we therefore procured some indifferent mould out of an adjoining lane that was light, and covered all our seeds with it; we planted our trees, such as fruit trees, forest trees, and shrubs, in this soil, excepting some more tender sorts of the latter, to which we added a small quantity of the mould about the fibres of the roots; the seeds came up well, and the trees struck root and flourished amazingly,

some of the fruit trees even bore fruit. The spring proved very wet and cold, and the summer dry and hot; our kitchen garden was the astonishment of all the country, finer vegetables of all sorts, and in greater profusion were never seen, and it will be proved by both the gentlemen, that they never tasted any sweeter or better in their lives. Mr. Robinson afterwards procured a large quantity of brick and lime rubbish, which he laid on the ground pretty thick, which completely made the ground. Now it so happened, that from the untowardness of the season, almost all the neighbouring gardens failed; the coldness of the spring, and the dryness of the summer, had produced an universal deficiency, but the moisture of our clay (being loosened up so deep) which the sun was always drawing towards the surface, supplied vegetation with a sufficiency of water during the dry weather, and the warmth of the coal ashes counteracted, in a great degree, the extreme coldness of the spring. These gardens are every day improving, and the trees continue to thrive, but what would have been the case with them if I had made large holes, filled these up with good mould, and planted the trees in them. In the first place, it is probable that these trees would have grown so long as the soil that was put in contained any vegetable food, but as soon as that was exhausted how was it to be recruited? and it is very clear, that any soil put into such a hole would be (as I have before remarked) the same as putting soil into a pot without a hole at the bottom, or the sides, by which means the superabundant water cannot pass away, and the soil is necessarily sooner dispossessed of its vegetative powers,



or carbon, than it would otherwise have been in the common course of things; it is also equally clear, and proved by every day's experience, that planting trees in a hole, with soil whose properties are more genial, is a very bad way; they will thrive well so long as the soil is loose, to admit of the roots forcing their way, but they are visibly checked as soon as they are obliged to extend themselves beyond the circumference of the hole; if it is so in such soils, what must it not be in all strong argillaceous soils? Gentlemen often wonder that their trees should grow well for a number of years, and afterwards become sickly and eventually fail; I have in my former profession frequently had occasion to take up such trees to prove the fact, which is clearly demonstrable; so far this circumstance corroborates my mode of deep ploughing upon all soils. Having thus given one proof, that such soils which are always denominated unfit for vegetation, especially when first brought up, are not so, but on the contrary perfectly congenial; and as it may be said that I have only proved my assertion by referring to the growth of trees and garden stuff, as it is termed, I will cite another case, which is equally well authenticated, and which applies to corn only, it will then be seen that the food of plants is found in a greater or lesser degree in all soils, and that whatever will grow vegetables and trees well, cannot fail of producing good corn.

About 20 years ago, my father and myself took a farm in the Mash Way, in the parish of Lambeth, in this county, belonging to my Lord Holland, it was so foul that it was thought almost impossible to cleanse it; it was in parts very stiff, in

others full of gravel, in others a fine loam; and these changes so quick and unexpected, as to make it very difficult to work, and more so to know how to crop it to advantage; our predecessor found it so, for he could make nothing of it, and was obliged to give up his lease, and his predecessor had failed upon it, yet bad as was the prospect, we agreed to give an increased rent for an extended term. One field lay for 36 acres, and it was the worst we had; we divided it into four allotments or fields, and planted hedges which we carefully fenced off; the first field was twelve acres, the second ten acres, the other two about seven acres each. The twelve acre piece was trenched two feet deep all over, and was planted with trees; the ten acres, being the foulest, we trenched also two feet deep, and sowed it with Poland oats, broad cast, four bushels to the acre; the next seven acres was repeatedly ploughed, harrowed, the weeds picked off and burnt, and the ashes spread: the twelve acres was a strong soil, near the gravel, the next was stronger; in places very shallow, the seven acres was a deep fine kindly loamy soil, this, after being made as clean as possible, and having had not less than four good ploughings of the usual depth, was sowed on the same day, with the same oats broad cast, four bushels to the acre. The progress of both was very handsome until the middle of July, when the weather set in very sultry and dry; the ten acres kept growing very fast and strong, while the seven acres were observed to be at a stand; the seven acres were ripe and reaped, about fifteen days before the ten acres were put into the barn, and were thrashed out in time to put the other in, and yielded 8 quarters, 6

bushels, and 1 peck to the acre; the other by being later, unfortunately met with some severe storms of thunder, wind, and rain, which lodged no inconsiderable portion of that which was towards each boundary, by which a great deal was lost and spoiled, for although the straw was very strong, and what might be almost called rank, yet the heads were so large and heavy, and it had tillered out so much, that it was too thick and ponderous to rise effectually afterwards; however it was reaped, and in due time bound, and thrashed out, and the produce of fine marketable oats was 11 quarters, 3 bushels per acre; and had it not been for the unfortunate state of the weather, it is not doubted but that it would have yielded 12 quarters; the grain was large and full, weighed 5 lb. to the bushel more than the other did; the straw was eighteen inches higher than the seven acre piece, the land was made perfectly clean, and was planted with young fruit trees that autumn; while the seven acres was obliged to undergo another cleansing; the further seven acres was sown with pease, which were sown after ploughing and cleansing, and were repeatedly horse hoed, which made the land effectually clean, but being near the gravel, and the hot weather succeeding, they produced but a very middling crop; the whole of the 36 acres had formerly been dug out, partly for brick earth, and partly for gravel: now as these crops were repeatedly viewed by that highly respectable and very ingenious man, the late Mr. Samuel More, who for many years was secretary to that noble institution, the Society of Arts and Sciences, in the Adelphi, at London; he with several of his friends, among them was Mr. Pratt;

used to walk out and mark the progress, and were particular in noticing the difference of the straw, &c. as it was growing, and which were earliest in showing ear; they also saw both of them while they were cleaning up for market, but which did not in fact take place, as we had occasion to consume the whole at home. There can be no question therefore about the fact. Some of the roots were examined while growing, and it was found that many of them had penetrated above 13 inches deep on the ten acre piece that was trenched. The point therefore, that was meant to be established, was not about the superiority of broad cast over any other system, because no other was tried, although it had been intended in the first instance; but it was to prove whether deep ploughing, which the trenching might be called, or shallow ploughing for corn crops had the preference, the question was therefore decisive, and established the fact beyond the power of contradiction, for here was raw soil fresh turned up without any manure whatever, succeeding a crop of wheat left very foul; the other, equally foul, was unusually well ploughed and cleaned, and the ashes burnt and spread, which was a partial dressing at least; the soil was as nearly alike as possible; if any difference the seven acres had the advantage, and therefore the experiment as far as it went, was admitted to be both fair and conclusive. I have thus established the point in favour of deep ploughing, which is also further confirmed by the daily practice of every kitchen gardener in all the varieties of soil with which this kingdom abounds. We have hitherto been speaking of the manner of working these fallows, we must now

say something as to the practice itself; its universality was once notorious, its continuance is lessening every day, and must in the end I have no doubt give way to more improved modes, or those farmers must be content with smaller profits. I know it is generally said, that when land is very foul and run out by hard and bad cropping, it is absolutely necessary to fallow, in order to cleanse it, and to fallow in order to give it rest, that it may recover its stamina; that neither of these are necessary, I will state the ideas of a very capital Sussex farmer upon the subject, indeed it is his general practice. Upon entering a farm of 500 acres, if the lease was nearly out, and supposing the land to be as foul and as much impoverished as land can be, the landlord should the season before the last tenant leaves it, cause to be sown among all the corn crops, either clover, trefoil, or rye-grass, by which means, foul as it may be, there will be some feed for a flock, to prevent the new tenant from being destitute of food for his sheep, in case he chooses to fold much, and the expence to the landlord will be but trifling; the first step he should advise upon taking possession of the farm, would be to make his wheat fallow, as clean as he could, and to plough it considerably deeper than it had ever been ploughed before, he would dung what he could, and the rest he would fold, this should be upon the strong soil; upon the hill if there is any, and which may be sandy, he would plough up 10 acres of rye etch, and would sow more rye upon it upon once ploughing; picking and cleaning the weeds off as well as he could, and burn them, this he would intend for early feed; upon the same hill, as soon as this was sown he

would plough up another large piece of rye etch, and sow it with winter tares, upon once ploughing, picking and burning as before: all the oat etch, where there was not a good plant of clover, or trefoil, he would plough up, and sow with tares or rye successively. Upon the stronger land, that which had been wheat should be sown with beans, the oat etch with pease or spring tares, the bean etch with oats and seeds, or spring tares; thus there would not be one acre of fallow upon his farm that could properly be called so: as soon as the first rye began to afford a moderate bite, he would pitch his fold lengthways, and feed off as close, but as fast as possible, having 500 South Down sheep; he should follow up closely with the plough, leaving only one day between the sheep and the plough. By the time this field was fed off, his first tares would afford a tolerable bite, and the fold should be pitched there longitudinally; in the mean time, as soon as the plough had finished, the harrows should be put in, and driven about in all directions, and the root weeds carefully picked off and burnt; it should then be immediately ploughed across, somewhat deeper; and, as soon as finished, again well harrowed, picked over and burnt; then a third time shallow ploughed and, sowed with barley; and after the harrowing it should be picked over, and the couch and other rubbish that may be brought up should be carried off, and in a few days sown with clover, harrowed once over and rolled; this operation would make the land cleaner than it had been for seven years before. As soon as there were two days tares fed off, the plough should be put in, and follow the fold in the same order as was observed in

the rye; and upon being finished, the same ploughing, harrowing, and cleansing, should take place; and after giving it three good ploughings, which would bring the season to the beginning of May, he would sow this with Swedish turnips; the forwardest of his seeds would be the rye grass and trefoil; the fold should be removed thither longitudinally, which as soon as the sheep had got two days in advance fed off, the plough should follow, and the land to be served exactly as before, as to the number of ploughings and harrowings, pickings and burnings, this is to be sowed with rape: the next that is fed off is to be immediately sown with white round turnip, after the same treatment as before; the next, that he could get ready, would be sowed with rape, and all the rest with white or red round turnip, reserving only one field of clover for a piece of lay wheat, designing his rape after it was fed off for wheat, and his spring tares upon the stronger land also for wheat, after feeding off. Whatever was in corn this year would be sowed with tares, or rye, as fast as the corn was got off, for spring feed; his turnips he would carefully twice hoe, he should drill his peas as well as beans, if the land was prodigiously foul, because he would otherwise be obliged to give both an extra ploughing, harrowing, cleansing, and burning, before he could sow any thing, which would be better done by hoeing, at the same time that it would strengthen his crop. Thus without a single fallow he could get this extensive farm not only into capital heart by folding, but also, it would be made perfectly clean, and the contents of his farm yards he would put upon his meadows after the second year, until he

had got most of them into as good condition. He has no doubt he could grow more corn in one year than his predecessor did in three or four, and that of the finest quality; he always ploughs deep, and agrees with me, that it invariably produces the finest grain: his mode of treating his farm yard at home, is thus, after making a firm foundation with chalk, &c. he brings a large quantity of fresh soil from some waste or from his headlands; upon this he puts a thick layer of stubble, all of which he carefully collects: after this has been regularly trod over by his sheep, he procures a quantity of fern, which he lays over the stubble; next a layer of stubble, and so alternately fern and stubble; and when they are exhausted, he finishes with oat straw: when the weather is dry and not severe, his sheep are always at work in the fold, but whenever it is wet, they are moved in the day time to the driest pastures, and at night into the above fold yard, where they are fed with hay in cribs, and sometimes chopped turnips, but always under shelter, as his rick yard is adjoining; the hay is put into the cribs, without going into the fold yard: by this process 500 sheep will make 600 loads of good manure, while the sheep will be improving amazingly; with this treatment of his land, he thinks he farms badly if he does not get four quarters of wheat upon the average per acre; upon some he has had five, and from six to seven quarters of barley; if from the untowardness of the season he cannot finish all the land by folding, or from any other particular cause, he then dungs the rest, as he always keeps what he calls a reserve against accidents; he has no great deal of meadow or pas-



ture; of that which he has, he cuts about one-third every year, which he immediately manures, and so keeps the whole mended every three years; at present his stock consists of 300 couples, and 300 wethers; he contrives to sell off about 150 old fat ewes and wethers, and about 100 lambs, of his cullings, reserving the prime for himself; his dairy is very small, he confines himself to four or five cows, for the sake of recruiting his team, and to supply his house with butter, and cheese; he has four teams of working oxen, of four to a light plough, and six to the stronger, all yoked; six light cart horses, and four stronger for the road; he is particularly careful in his choice of these light horses, that have very quick steps, as with these he always harrows; he has also a store of young steers, which he works occasionally in order to make them handy, and to bring forward for his team; so that at seed time, and harvest, he is never at a loss for an additional team, or two, or even more, if he is hard drove; his mode of working is always double tides, from six in the morning until ten, and then they leave off, and begin at two, and leave off at seven; he shifts his oxen every day, that is, there is always a fresh one in the team; in his feed of those that work he is particularly nice; if they go to grass the best food is reserved for them; if fed in the yard, the best and sweetest soft hay, or green meat, as tares, rye, or turnips, and the yard always kept deep in straw, that they may lie clean and dry; under this management, it is wonderful how well they thrive; and what a prodigious deal of work they do.

Having somewhat digressed from the subject of

fallowing to give my friend and his system of farming a corner in this report, we will return to an examination of the principle of fallowing as it is generally practised.

My friend Mr. Davis says, in his excellent report of Wiltshire, that where the land is exhausted by repeated crops of corn, manure will give the quantity, but rest alone the quality. Now, I have before said, in the preface to this work, that although the soil has been in a state of annual production, to a greater or less extent, for a multitude of generations, even from the remotest period, yet so prolific is this laboratory, that its liberalities seem inexhaustible; most undoubtedly it is so, for, by the small addition of an inch or two of subsoil, ploughed up in the course of tillage, and the manure that is usually applied, properly intermixed, the quality will be as good as if seven years of rest was given to it; but the sort of soil, the kind of manure, the weight of the crop, and the nature of the season will always operate upon the quality as well as the quantity of the seed, for we know that what may be a fair plant on the ground in a dry season may be superabundant in a wet one; and thereby the quality of the seed will be materially altered, and vice versa. We see, in the management I have just stated, that no fallows whatever are adopted, and yet no corn in the world can be finer than my friend has under that management. My neighbour Mr. Simmon, who was a very shrewd sensible farmer, at Brixton Causeway, always sowed his wheat after tares, or rye, which had been cut green, and sold; the land when cleared he well dunged, and twice or thrice ploughed, and then he

sowed it with wheat; his corn was always sought for, both for seed, and also by the miller, for which he was sure to get the best price. Mr. Hanscomb did the same, he never made a fallow. Mr. Tull proved that for 18 years together he successively sowed wheat, upon a considerable extent of very poor land, and that the crops increased in goodness; as the ground no doubt increased in heart, and this upon the same land, after once ploughing, without either fallow or manure; this did very well for an experiment, but he was not the only one that entertained this notion, for we find that the late Sir Digby Legard, a gentleman of considerable property in the north, had done the same, and communicated the result to the Society of Arts and Sciences in London, for which they voted him a medal; several other gentlemen have done similar things; and I take it to be upon this principle, that the Rev. Mr. Cook set out to establish his system; notwithstanding which, and of the determination to explode fallows, I am very far from agreeing to the system of perpetual white crops; for if that was to prevail, what would become of our sheep and our cattle. Not one of the many sensible farmers who continue the practice of fallowing, has yet proved to my conviction (and I have in the course of this extensive survey seized every occasion to argue the point with them) that the intermission of green crops fed off with the increased crops of grain arising therefrom, is not to the farmer, and consequently to the public, more valuable, and profitable, than any two crops of grain with a summer and winter fallow between; and each crop dunged; and if they are so much more valuable, how much more so must

they be than Mr. Tull's successive crops of wheat. But suppose, that in the room of those green crops usually fed off, such as tares, turnips, rape, and rye, an occasional crop of drilled beans, or peas, as the land may suit, always well hoed, with now and then rye grass, and trefoil, for the forward ewes and lambs, never left for hay, but broke up for wheat, with potatoes, carrots, or cabbages, (sometimes introduced to break the course) well hoed and landed up; I am not clear, that in a course of 14 or 15 years cropping after this manner, without any other dressing but what arises from the fold, that any system of cropping with fallowing, will yield a profit which can at all stand in competition with it.

My friend Mr. Brown, like Mr. Davis, does not however agree in this principle; as they are both very sensible well informed men, joined to a great deal of experience, I should almost be tempted to doubt my own opinion, and therefore I speak with great deference to their judgment: but as we are daily seeing (upon the improved system of husbandry) so many circumstances which tend to confirm it, I would fain believe that they did not give the subject that consideration which they are in general wont to do every matter that comes under their cognizance. The latter gentleman says in his well written report of Derbyshire, page 29, "from what has been said the Board will perceive "that fallowing is practised in Derbyshire, and I "am proud to add, by the very best practical farmers. "Green crops, such as vetches, clover, cabbages, "cole seed, and turnips, are no doubt substituted, "with additional ploughings, in lieu of fallows, in

“ many parts of the kingdom, particularly in the  
“ neighbourhood of great towns, post roads, or  
“ wherever what I call foreign manures, (such as  
“ are brought into the farm over and above that  
“ which annually renews from the produce,) are  
“ procured, yet even in this situation, land may be  
“ over cropped, and rendered unfruitful for want of  
“ clean fallowing and rest. Although this may not  
“ appear at first sight, yet, as far as my experience  
“ goes, sooner or later the land will be reduced to  
“ that state of weakness and imbecility, in which  
“ no manure, no hasty stimulus, or drunken dress-  
“ ing, or green crop, will enable it to sustain and  
“ perfect a beneficial crop of grain. •Manure, and  
“ green crops, it is true, will produce a crop of  
“ straw, but for want of that vegetable aliment,  
“ which can only be restored by fallowing and rest,  
“ the crops of grain will ever fall short in that  
“ farina which is the life and soul of all white  
“ crops. I am aware, that the advocates for ex-  
“ ploding fallows will say, why do you dress your  
“ land so much ? you must crop it oftener, for the  
“ land is too rank : follow their notion, and you  
“ will find your system of husbandry reduced to  
“ such a crisis, between weeds and straw, that  
“ fifty to one the crop will fall a sacrifice either to  
“ the one or to the other ; if it has the good for-  
“ tune to escape the calamity of being laid, from  
“ the happy circumstance of a dry season, it then  
“ has to struggle with the chance of being overrun  
“ with such weeds as are not checked by drought,  
“ and frequently, instead of a crop of wheat, you  
“ reap wild oats.”

Such is the language of Mr. Brown, and a more

exact concurrence in sentiment there cannot well be, than between these two worthy men ; much as I respect them, my duty is paramount to every other consideration ; I will therefore endeavour to remove their scruples. In the hands of bad farmers, or among those who are obstinately bent upon their own practices, Mr. Brown's reasoning may apply, but the intent of all his labours, in a very active employ, as well as mine upon a much less scale, and particularly those of the Board of Agriculture, is to open the eyes of men to their own real interest ; and to make bad farmers good ones ; if we do not do that, at least as far as our abilities will permit us, we do nothing, nay, we are doing a serious evil, for we have given the public to understand, that such and such things may be done, that a great deal more corn and meat may be produced from off the same quantity of ground ; but we have failed in convincing the farmer how it is to be done, (and he is the most material person to be convinced,) and therefore we have done mischief instead of good. I again repeat that our object is to make bad farmers good ones ; now he would certainly rank among the latter class, if by exploding fallows, and by introducing green crops, he did not also have occasional hoeing crops, as peas and beans, potatoes, and the like, between his course of wheat. If the land is always well and deep ploughed, properly pulverized by the harrow, kept clean by the hoe, and in good heart by the fold (if the soil will admit of it) and the farmer has a careful attention to the cleanliness and purity of his seed corn, I cannot see how it is possible for land to become foul ; for farmers who hold much land,

have it not in their power to make their land rank, the reverse is too much the case, with almost all descriptions, however involuntary it may be; the nearer we can bring the science of agriculture to that of gardening, the nearer we shall approach perfection. Let us compare the two practices.

When a kitchen gardener (I am speaking of those near London, to give my friend the full advantage of his argument) has any particular crop which turns out to be very fine and true, he is curious to mark some of the best which he carefully saves for seed; he does not take them up to replant them on a poorer piece of land, but he lets them stand where they grow, and in land in such a high state of manurage and cultivation as no farmer can ever equal; in fact, to use my friend's language, perhaps it is most completely drunk with dressing. Every seedsman, and every nurseryman, and gardener too, that sees such a crop, will give to such a person whatever price he may choose to ask for all the seed that he may save from that crop; I have very frequently bought such seed, and I appeal to every seedsman and nurseryman, whether such seed is not so much larger, plumper, and brighter coloured, especially if it happens to be cauliflower, broccolo, or cabbage seed, as to induce them often to believe that it could not be produced from the sort they had bargained for, and that they find more difficulty in marrying such seeds, as it is termed, than any seed of the same sort that is produced from land in a moderate state of cultivation. No seedsman of repute will at any time purchase such seed, but in proportion as the credit and reputation of the grower is highly satisfactory to

them. If, therefore, land in the highest state of manurage does produce such seed as I have described from vegetables, I would then ask, what is there in the composition of the plants of corn so different from those of culinary vegetables, that is, to make high dressing the former produce straw, but little or no farina in the grain? As I have before observed, a man may saturate a field or two with dressing, but no man need be afraid of overdoing his whole farm, be it small, or be it great; we must, however, take the farmers of the old school gently by the hand; they have their prejudices and their ancient practices to overcome, and it is a work of no small difficulty to effect; but if they see so many discordant opinions among men of science and skill, and who may be supposed from their situations, in life to possess the means of acquiring more certain information; and to make more general observations than they can possibly make; it is not likely, that any reasoning, however strong and convincing, from one or two individuals can be likely to prevail; and I know of no other mode of producing so great a change, but for gentlemen to shew, by example and proof, first, that such a change is to their advantage; and secondly, to guard against any imposition, by compulsory clauses in their respective leases.

Having given the practice of a very able farmer, and quoted some cases to prove that deep ploughing is proper in most soils that are generally conceived injurious to vegetation; and that fallowing, as now practised, is not necessary upon any soil, let the condition of the land be what it may, with one exception only; we will now take a slight view of



it chemically, and shew its positive disadvantage to the soil.

A very poor soil, says Dr. George Fordyce, will be but little benefited by fallowing; inasmuch as there is nothing contained in it capable of being converted into mucilage, except the rain water, it is better to employ an enriching crop. Fallowing for several years would destroy a soil, as it would convert the whole putrescent substances into mucilage, and that mucilage into salts, and these would be decomposed. Fallowing is only necessary as a remedy for land exhausted; by what? Not by crops, but by lime; he then advises the land to be ploughed as deep as possible, so as to bring up a new body of mould before winter, then fallow it well the ensuing summer and autumn, that every part of it may be exposed to the winter and summer air; dung it strongly, then sow a crop of these plants, (clover for example, or buck wheat) that yield most mucilaginous matter, and before their leaves have done flourishing, plough in that crop. If this be done exactly as here described, the land will acquire a new stock of nourishment, and come into good heart again; dissolved in water, and applied to plants it makes them grow luxuriant. In a moist soil it jellies the water, and prevents it from soaking through the sides of the roots of plants. In a dry soil it prevents the water from being exhaled. It gives tenacity to a sandy soil, and friability to a clayey soil. It is converted into the juices of plants, and nourishes them.

Dr. Ingenhousz thus speaks of fallowing. Instead of letting the land lie idle and unproductive by fallowing, he proposes to impregnate the soil

with an acid, especially the sulphuric, for its cheapness; as by combining with the calcareous part of the soil, it would form gypsum and Epsom salt with its magnesian part, both would then give rise to the developement of carbonic acid, the principal food of plants.

The Earl of Dundonald says, that alkaline salts act more powerfully on some kinds of peat and inert vegetable matters than on others, particularly on those which become oxygenated by being exposed to the action of the air. This points out, that the practice of fallowing ground, containing much vegetable matter, by repeatedly exposing fresh surfaces to the action of the air, occasions the vegetable matter to be more easily dissolved or acted upon by alkaline salts; but when no such application is made, the insolubility, (or in other words, not to be dissolved) of the vegetable matter, is by fallowing increased, which to certain grounds may prove instead of a benefit, a real injury. The putrefaction or solution of vegetable substances is more readily promoted by a close or stagnated state of the air, than by a constant supply and addition of oxygen or pure air, as happens to vegetable substances when subjected to the operation of fallowing. Clover, sainfoin, cabbages, turnips, leguminous crops, hemp, and those plants which overshadow the ground, and cause a stagnation of air, prevent thereby the excessive exhalation of moisture, and promote the putrefaction or decomposition of vegetable matters contained in the soils: such crops will therefore prove more economical and beneficial to subsequent crops than the present system of fallowing.

By fallowing not only one year's rent and labour are lost, but likewise the vegetable matter contained in the soil is thereby rendered less fit to promote the growth of subsequent crops. Fallowing should be practised but sparingly; its principal use is in altering the mechanical arrangement of the soil, either by pulverizing it, or making it more compact (both of which effects, according to circumstances, are thereby produced) and in destroying roots, seed weeds, or insects; these objects being attained, recourse should never be had to the same operation, unless it becomes requisite from the failure of crops, or other incidental causes, which are best provided against by substituting the culture of drill crops instead of a fallow.

To soils which contain much inert vegetable matter, it is probable that advantages would be derived from umbrageous green crops without fallowing, equal to those experienced when hemp is made to precede a crop of wheat; without which preparation this crop would not have answered the expectation of the farmer. It is therefore obvious, if ground receives benefit by being overshadowed, the same ground must receive injury by a directly contrary mode of treatment.

Messrs. Duhamel, Priestly, and Senebier, have proved, that it is not so much by the quality of the soil that vegetables live and grow, but by the quantity of nitrogenous gas which they imbibe, and which serves them for aliment.

Hence it arises, that vegetation is more vigorous when a greater quantity of those bodies, which afford this gas by their decomposition, are presented to the plant; these are vegetables in a state of pu-

trefaction ; now, fallowing must in any season, but particularly in a very dry summer, prevent the accumulation of nitrogen, and, by consequence, lessen the quantity of pabula, which, by being cropped, the land would necessarily have acquired.

Hassenfraz, Tillet, Ruckert, Giobert, Kirwan, and Percival, have each of them confirmed the doctrine of the food of plants, and that by possessing the property of converting nitrogenous gas and carbonic acid into food, fallowing of the ground is an unnecessary loss of a crop ; for as it seems that the base of the latter contributes to the formation of vegetable fibres, so it is clear that fallowing, by destroying the putrefactive substances in the soil, removes the cause of both nitrogen and carbon, and must lessen both the quantity and the quality of the succeeding crop.

Having been unexpectedly led into a more extensive detail than I first intended, I shall only further observe, that in order to make my case as strong as I am able, I propose to draw out the mode of farming generally practised by those who fallow in this county ; against which I shall charge the expences. I shall in course give credit for the value of the crops. I propose to do the same by the system which admits of no fallow ; from whence it will be seen (and which is better than all the arguments in the world) which of the two appears to be the most beneficial to the farmer, as well as to the landlord and to the public ; in doing of which, I am well aware of two things, first, that it may be objected, that the system I have made choice of in the course of fallowing is exceptionable ; secondly, that I have taken credit for

crops in the new system which ought not to be taken into the account.

To the first I answer, that I do not pledge myself that it is the best course that might be chosen, any more than that the one I have laid down for the new system is the best; they must be liable to certain deviations and modifications; but they may be sufficiently correct for our purpose. To the second, I need only say, that as I shall give credit for every thing that is produced on the ground, whether corn, or grass, for the term of years on the old system, so I am entitled to do the same by the new; whether I grow one crop in the course of the year, or two. I shall not pledge myself that my charges and calculations are so perfectly correct, but that some practical men may discover an error; but, I believe, whatever errors are found, they do not attach to one system more than to the other, and therefore they cannot weigh against the principle I have advanced.

*Fallowing system on one acre computed.*

|                                                                                                                             | <i>l. s. d.</i>                    |                                           | <i>l. s. d.</i> |
|-----------------------------------------------------------------------------------------------------------------------------|------------------------------------|-------------------------------------------|-----------------|
| 1. Fallow, four ploughings, &c.<br>at 7s. 6d. ....                                                                          | 1 10 0                             |                                           |                 |
| 2. Wheat, three bushels of seed, 6s.<br>Sowing, harrowing, weeding, &c.<br>Dunging, carting, and spreading<br>Reaping ..... | 0 18 0<br>0 7 6<br>2 10 0<br>0 6 0 | By Wheat, 24 bushels<br>at 6s. ....       | 7 4 0           |
| 3. Oats, two ploughings, &c. ....<br>4 bushels of seed, 2s. 6d. ....<br>Sowing, harrowing, weeding, &c.<br>Mowing .....     | 0 15 0<br>0 10 0<br>0 7 6<br>0 5 0 | By Oats, 6 qrs. at 20s. ....              | 6 0 0           |
| 4. Beans, two ploughings, &c. ....<br>5 pecks of seed, 3s. ....<br>Sowing, harrowing, hoeing<br>twice .....                 | 0 15 0<br>0 3 9<br>1 3 6<br>0 8 0  | By beans, 5 qrs. 24s. ....                | 6 0 0           |
| 5. Fallow, four ploughings, &c. ....<br>6. Wheat, as before .....                                                           | 1 10 0<br>4 1 6                    | Fallow<br>By Wheat, 24 bushels            | 7 4 0           |
| 7. Oats, as before .....                                                                                                    | 1 17 6                             | Oats, 6 quarters                          | 6 0 0           |
| 8. Peas, two ploughings, &c. ....<br>Drilling, covering, &c. ....<br>Hoeing twice .....                                     | 0 15 0<br>0 12 6<br>0 18 0         | Peas, 4 do. 32s. ....                     | 6 8 0           |
| Seed, two bushels .....                                                                                                     | 0 8 0                              |                                           |                 |
| Hooking .....                                                                                                               | 0 7 6                              | Fallow                                    |                 |
| 9. Fallow, four ploughings, &c. ....<br>Dunging, spreading, &c. ....                                                        | 1 10 0<br>2 10 0                   |                                           |                 |
| 10. Turnips, one pint sowing and<br>harrowing .....                                                                         | 0 3 6                              | By Turnips .....                          | 4 0 0           |
| Hoeing twice .....                                                                                                          | 0 11 0                             | By Barley, 5 quarters                     | 6 0 0           |
| Barley, two ploughings, &c. ....<br>8 bushels of seed, 3s. ....<br>14 do. of red clover .....                               | 0 15 0<br>0 9 0<br>0 7 0           |                                           |                 |
| Sowing, harrowing, weeding<br>Mowing barley .....                                                                           | 0 7 6<br>0 6 0                     |                                           |                 |
| 11. Clover mowing twice .....                                                                                               | 0 12 0                             | By Clover, 2 loads ..                     | 6 0 0           |
| Making, &c. ....                                                                                                            | 0 12 0                             | By Seed .....                             | 4 10 0          |
| 12. Clover, mowing and making                                                                                               | 1 4 0                              | By Clover, 2 loads, &c.                   | 7 10 0          |
| 13. Wheat, first ploughing ....<br>Seed, harrowing, weeding, as<br>before .....                                             | 0 7 6<br>1 11 6                    | By Wheat, 26 bushels                      | 7 16 0          |
| 14. Oats, as before .....                                                                                                   | 1 17 6                             | By Oats, 5 quarters ..                    | 5 0 0           |
| 15. Beans, as before .....                                                                                                  | 2 10 8                             | By Beans, 4½ quarters                     | 5 8 0           |
| Rent and taxes .....                                                                                                        | 18 15 0                            |                                           |                 |
|                                                                                                                             | <hr/> £54 13 0                     |                                           |                 |
|                                                                                                                             |                                    |                                           | <hr/> £85 0 0   |
|                                                                                                                             |                                    | Contra                                    | 54 13 0         |
|                                                                                                                             |                                    |                                           | <hr/>           |
|                                                                                                                             |                                    | Balance in favour of this<br>system ..... | 30 7 0          |

*Fallowing exploded on one acre computed.*

|                                                    | <i>l. s. d.</i> |                                                     | <i>l. s. d.</i> |
|----------------------------------------------------|-----------------|-----------------------------------------------------|-----------------|
| 1. 4 ploughings 7s. 6d. ....                       | 1 10 0          | Fallow                                              |                 |
| 2. Wheat, three bushels, 6s. ...                   | 0 18 0          | By Wheat, 24 bush. 6s. 7 4                          |                 |
| Dunging, and expences as before .....              | 4 1 6           |                                                     |                 |
| 3. Tares, two ploughings .....                     | 0 15 0          | By Tares fed off . . . 2 10 0                       |                 |
| Seed, sowing, harrowing, &c. ....                  | 0 15 0          |                                                     |                 |
| Turnips, two ploughings, ....                      | 0 15 0          | By Turnips fed off 4 0 0                            |                 |
| Seed, sowing, harrowing, hoeing, &c. ....          | 0 14 6          |                                                     |                 |
| 4. Barley, two ploughings .....                    | 0 15 0          | By barley, 6 quarters 7 4 0                         |                 |
| Seed, &c. as before .....                          | 1 2 6           |                                                     |                 |
| 14lb. red clover .....                             | 0 7 0           |                                                     |                 |
| 5. Clover, twice mowing, and making .....          | 1 4 0           | By 2 loads and feed of clover . . . . . 7 10 0      |                 |
| 6. Wheat, one ploughing .....                      | 0 7 6           | By Wheat, 20 bushels 7 16 0                         |                 |
| Seed, sowing, weeding, and reaping .....           | 1 11 6          |                                                     |                 |
| 7. Beans, two ploughings .....                     | 0 15 0          | By Beans, early, 5 qrs. 6 0 0                       |                 |
| Seed, sowing, two hoeings, and bagging .....       | 1 15 8          |                                                     |                 |
| 8. Rye, one ploughing .....                        | 0 7 6           | By Rye, fed off . . . 2 0 0                         |                 |
| Seed, sowing, and harrowing only .....             | 1 3 0           |                                                     |                 |
| Oats, two ploughings .....                         | 0 15 0          | By Oats, 7 quarters 7 0 0                           |                 |
| Seed, sowing, harrowing, weeding, and mowing ..... | 1 1 0           |                                                     |                 |
| Rape, one ploughing .....                          | 0 7 6           | By Rape fed off . . . 1 5 0                         |                 |
| Seed, sowing, and harrowing only .....             | 0 3 6           |                                                     |                 |
| 9. Peas, two ploughings .....                      | 0 15 0          | By Peas, 4 quarters 6 8 0                           |                 |
| Seed, sowing, harrowing, two hoeings .....         | 2 1 0           |                                                     |                 |
| 10. Wheat, two ploughings .....                    | 0 15 0          | By Wheat, 4 quarters 9 12 0                         |                 |
| Seed, &c. as before .....                          | 1 11 6          |                                                     |                 |
| 11. Tares, two ploughings .....                    | 0 15 0          | By Tares fed off . . . 2 10 0                       |                 |
| Seeds, sowing, and harrowing .....                 | 0 15 0          |                                                     |                 |
| Turnips, two ploughings .....                      | 0 15 0          | By Turnips fed off . . 4 0 0                        |                 |
| Seed, sowing, harrowing, two hoeings .....         | 0 14 6          |                                                     |                 |
| 12. Barley, two ploughings .....                   | 0 15 0          | By Barley, 6 quarters 7 4 0                         |                 |
| Seed, and sowing, &c. as before .....              | 1 2 6           |                                                     |                 |
| 14lb. red clover .....                             | 0 7 0           |                                                     |                 |
| 13. Clover, twice mowed, and making .....          | 1 4 0           | By 2 load of clover, and once folded . . . . 7 10 0 |                 |
| 14. Clover, once mowed and fed .....               | 0 12 0          | By 2 load of clover and once fed . . . . . 7 10 0   |                 |
| 15. Beans, one ploughing .....                     | 0 7 6           | By Beans, 5 quarters 6 0 0                          |                 |
| Seed, &c. ....                                     | 1 15 8          |                                                     |                 |
| Rent and taxes .....                               | 18 15 0         |                                                     |                 |

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*£*54 4 6

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*£*103 3 0  
 54 4 0

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 48 18 6

Balance brought over 30 7 0

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 Balance in favour of this system over the other 18 11 6

**MISCELLANEOUS.****BEER.**

The materials of which this most universal and necessary article ought to be made, being of the first consequence to the health of the people, to the support of the revenue, and to the encouragement of the agriculture of the kingdom, I have thought it well entitled to a place among the miscellaneous parts of this report.

Malt liquor is the beverage, to a greater or less extent, of four-fifths of the people of this island, the remaining portion drinking cyder or water. The most prevailing kind of malt liquor in the country is strong beer, called in some places ale; and small or table beer; that of the metropolis and all large manufacturing towns, such as Manchester, Birmingham, Sheffield, with many of the sea-port towns, Liverpool, Chester, Hull, Bristol, &c. is porter.

Ale and alehouses are mentioned in the laws of Ina, about the year 728, and it was before the days of our first Henry, that ale was considered a very wholesome drink; but after that period it began to receive some sort of commixture by which its quality was vitiated; and thus continued, I apprehend, to get worse and worse, instead of better, because in the reign of Henry III the following distich appeared from one of their poets:

Nescio quid monstrum Stygiæ conforme paludi,  
Cervisiam pleniq; vocant, nil spissius illa  
Dum bibitur, nil clarius est dum mingitur, ergo  
Constat quod multas faeces in ventre relinquit.



The quality of the beer, so far as it relates to the public breweries throughout the kingdom, has received a greater deterioration since the seasons of 1800 and 1801 than perhaps during the whole period since the time of Henry the First, and which was to a certain extent sanctioned by the executive government, if not by the legislature.

It arose, first, from the scarcity and dearth of barley; and secondly, by the introduction of foreign drugs. But in private families, where they brew their own beer, it still preserves its original native purity, sweetness, and goodness, and leaves no faeces behind it. The brewers beer, particularly their small-beer, is poor, thin, and fiery; their ale is compounded, as I am well informed, of the following ingredients; and such beer, at the late price of malt and hops, is a disgrace to the country.

#### ALE.

Grains of paradise, capsicum, coriander,\* cocculus Indicus, quassia, liquorice, brown sugar, shag tobacco, sal martis, or green vitriol.

The grains of paradise (*amomum grana paradisi*) are acrid, and their action stimulating; the taste of the capsicum is extremely pungent and acrimonious, more especially that species called *frutescens*, or bird pepper. Coriander seeds are carminative and stomachic. *Cocculus Indicus*, the plant grows in Malabar, and in Linnæus's *Hortus Malabaricus* it is described under the name of *Natslatum*. It is the berries which are used, and are accounted of so hurtful and pernicious a nature as to be omitted in

\* 1 lb. of coriander seed is equal to one bushel of malt.

the modern pharmacopœias. Condronchius, as well as Matthiolus, who have written on the berries of this plant, describe them as acrid and bitter, narcotic, and producing nausea, hiccough, and other uneasy sensations. Ray says that the berries mixed with old cheese, honey, and wheaten meal made up into balls, will stupify and eventually kill fish, producing vertigo and apparently uncommon pain. Quassia is a native of Surinam, and was called so after the name of a negro there (Quassi) who was first observed to make use of it among his countrymen. Mons. Dahberg sent it to Linnæus, July 1765; it is a pure and simple bitter, and so strong that  $\frac{1}{4}$  lb. of this plant will go as far as 4 lb. of the best hops. Liquorice (*glycyrrhiza glabra*), when pure in its powdered state, which is but seldom the case, its constituents are saccharine and mucilaginous. Shag tobacco, (*nicotiana tabacum*) in infusion it is powerfully diuretic, it is burning, very acrid and narcotic, and by distillation it produces an oil so strong as to kill almost instantly small animals. In three casks of ale sent to the house of a late under secretary of state in Westminster, there was discovered in each of the casks a large quantity of this tobacco; the beer had most seriously disordered the mistress, housekeeper, and some of the other servants, yet the brewer was suffered to take away the casks unmolested and unpunished. Salmartis formerly, now ferrum vitriolatum, the addition of the sulphate of iron, or green vitriol, is to produce a good frothy head to the beer. The effect is to excite pain in the stomach, and spasms in the bowels with vomiting.

## PORTER.

There has been a time when the beer made in this great metropolis was sought after in all quarters of the world. Between 5 and 600 years ago, the case was very different. Hamburgh was then of all places in Europe, the most famous for beer. In the middle of the 13th century there were in Hamburgh not fewer than 530 breweries. England, Flanders, and all the kingdoms of the north, were supplied with beer from that city. In the 15th century, its beer still maintained its reputation, and continued to be one of its principal exports. In the middle of the 17th century, the King of Sweden, as an act of serious revenge against the citizens of Hamburgh, prohibited the importation of their beer into his dominions; and it was not until the end of that century, that the Hamburgh trade in this liquor began to decline, because English beer and ale began to be in most places preferred. It was then salubrious, nutritive, and exhilarating; it was pleasant to drink, and free from noxious ingredients.

But that trash now called porter, is the reverse. We cannot tell of how many, or what ingredients or compounds it is made, but we know it is not made of corn. It would not answer for the manufacturers of this liquid, to confine themselves to a smaller quantity of malt than they formerly used, in proportion to a given quantity of water, for the people might then as well drink small beer. It was necessary to give it the appearance of strength, and for this purpose they have put into it ingredients, of an acid and stimulating quality, so that in the

mouth the porter has some flavour, but in the stomach it is cold, rapid, and unwholesome; it prevents digestion, and gives rise to numberless complaints.

Among these ingredients are to be found, coculus Indicus, one ounce of which is said to be equal to one bushel of malt—liquorice, or Spanish juice—treacle—shag tobacco—alum (sulphas aluminæ)—sour beer—sal martis (ferrum vitriolatum) green vitriol—isinglass (as a clarifier) isinglass ich-thyocalla—quassia. Of the quassia much has been said of its bad properties, but Dr. Duncan, in his Pharmacopœia Edin. as well as other celebrated medical men speak in its praise. The former says, “It is a very pure and simple bitter, and may be given in all cases where bitters are proper. It has been exhibited in intermittent and bilious fevers, in stomachic complaints, in lenteria, in cachexy, dropsies, leucorrhœa, and gout. It is much used in this country to give the bitterness to malt liquors, though it subjects those brewers who employ it to very heavy penalties.” It is nevertheless used in immense quantities, and I have been informed by a friend in the custom-house, that of quassia, Guinea grains, Spanish juice, and the like, the importation is beyond all conception great, and increases every year, and the merchants who import them have repeatedly told him they are principally consumed by the porter brewers.\*

No wonder then, I think, that they should declare they have three years stock of hops by them,

\* At a late trial before Lord Ellenborough between a brewer and a publican, the latter being asked by his lordship what he meant by *old beer*, replied, it was neither porter nor ale, but a composition with which their trade was furnished by certain chemists to improve the flavour of their stale beer.

when that article is found to give way to drugs; the produce of other countries. It is not long since a large quantity of drugs, but of what kind I have now no recollection, were seized at a brewer's in the Borough of Southwark.\*

The new mode of compounding porter, which has been practised of late years, and is supposed to have originated at a very popular brewhouse, and the rival of the celebrated Whitbread, is now carried to the highest pitch of perfection. The compounders are saved all that trouble, which brewers were formerly put to, of keeping their casks and butts in cellars for a length of time, during which, they had to wait until it became seasoned, keeping so much capital idle and locked up. All the seasoning stuff is now ready made to their hands, by a set of chemical gentlemen, whose trade it is to prepare it; as it is for others to take off the stale and sour beer; and by a process peculiar to themselves to manufacture it afresh, and thereby to make it vendible.

This compound is taken and mixed with another liquid, recently made from a small quantity of malt and hops; and from the happy union of these ingredients that once famous liquor porter is now made.

If malt or hops, or both, advance much in price, whether it be from speculation, or indifferent crops, the brewer rises the price of porter immediately, although his warehouses may be full, and he may have three years stock on hand. If the price of

\* Good porter, says an eminent physician, and such as was made in better and former times, often proves a grateful and salutary beverage, and affords peculiar support and refreshment under colliquative sweats.

these articles fall as rapidly as they rose, which if it has proceeded from the former cause, they may and frequently do, he forgets to lower the price of his beer, and would not do it at all if the clamour of the public or some rival did not force him to it; even then he does it by slow degrees.

In the early part of the year 1803, there was a brewer in the Borough of Southwark, whose name ought to be written in characters of gold, whose beer was far superior in strength and flavour to any that could be found in the metropolis, who sold his beer at such a reasonable price as to enable his customers, the publicans, to retail it at 4d. per quart, while the inferior beer of any other brewer was sold at 4½d.\* Are we to suppose that this person sold without profit, and submitted to losses in his trade from motives of benevolence and philanthropy? that he had no other object in view but the convenience and comfort of his fellow creatures? no such thing; he must know and feel that he best promotes his own interest in taking a less exorbitant profit than others.

The cause of this deterioration was not entirely owing to the scarcity of either malt or hops, nor was it necessary to be continued through such seasons as 1803 and 1804, but it is because the greater part of the public houses in London, and for ten miles round it, are in the hands of the porter brewers, who, in conjunction with the rectifiers,

\* The consumption in London is about 40,000,000 gallons, or 160,000,000 quarts, the profit to the brewers at only one half-penny advance per quart, would amount to £333,333 6s. 8d.; and at one penny per quart, which has also been attempted to be done, it would have yielded the enormous sum of £666,666 13s. 4d.

monopolize every thing of the kind that happens to be offered for sale or to rent.

It is computed that within the circle I have just described, there are not less than 6000 licensed public houses, or about 26 private to one public house, taking it on a scale of 156,000 inhabited houses. In the above limits it is calculated, that including inmates and lodgers, there are about 220,000 families, who are more or less customers to alehouses; and upon these data the proportion is one public house to every 37 families. It has been generally understood that about sixty families are necessary to support a creditable public house. It would seem from thence, that from the number of failures in that line, and persons who were discharged under the late insolvent acts, many have been ruined for want of a due portion of trade, as well as from the badness of the beer, which has increased the sale of spirits at the gin shops, and the want of a more feeling disposition in the landlords, the brewers. And it would seem as if this really was the case, because fewer failures happen among the free public houses in proportion than among those which are monopolized.

When the last duty was laid on hops, it was represented by the hop-planters of Kent, and other places, that great quantities of these nauseous drugs were used, and it was then declared that nothing but malt and hops should be used. The then chancellor of the exchequer took occasion to express in very strong terms his utter abhorrence of that most mischievous, unjust, and tyrannical practice of monopolizing public houses, and the injurious ten-

dency of forcing the tenants of them to take beer the produce of such vile compositions,

If it be necessary for the public good to affix an assize for bread, both as to weight, quality, and price, because it is the great staff of life, it is not surely less necessary to do something of the same kind with porter, which to a hard working mechanic is become equally necessary; and without which, he could not support so much fatigue. Every baker that departs from this wise regulation is subject to a heavy fine, which he must pay or go to gaol; and he also loses the bread which is thus deficient in quality or weight. While these petty delinquents are prosecuted with severity, great offenders are suffered to escape; indeed they are too great for any moderate man to cope with, and nothing but the strong arm of power, exerted for the good of mankind, can put an effectual stop to the evil; and it is to be hoped that such members of the board as have seats in either of the houses of parliament, will take up the matter for the benefit of immense numbers of their fellow creatures.

This system of monopoly, injustice, and fraud, is still further aggravated by the circumstance of its falling with greater oppression on the lower, than on any other classes of people; not only because they are unable to procure beverage of a superior kind, but because the worst beer of all, such as that which is re-manufactured, is sold in those places where they generally reside.

In poor low neighbourhoods like those in Kent-street, Union-street, and other remote parts of the Borough of Southwark, St. George's Fields, the town of Lambeth, &c. houses of all kinds and in



course public houses, are cheaper than in other places. They are also oftener exposed to sale; there is thus a greater chance, and it does actually happen, that the brewers become the possessors of them. It is besides more than probable, that the occupiers of such houses are in indigent circumstances, in which case they are the slaves of their landlords, for whom as I have said before, they are obliged to sell the very worst and most deleterious trash of all, and the labouring poor who have no time to go in quest of other houses, are obliged to drink what they can get, or substitute in its stead (which unfortunately is now too common) another liquid equally injurious to their health, as well as ruinous to their morals.\*

As great land owners, the board have additional motives for interesting themselves on this most important subject; because if the brewers go on unmolested in extracting from drugs, and converting the essence into what they call beer, there must be less demand and consumption for barley and hops, which will ultimately prove highly injurious to agriculture, and cannot fail in its consequences to lessen the revenue. Other means must then be resorted to, to raise a sum equivalent to the present duties on malt and hops.

#### BEES,

In detailing the character and value of this in-

\* This is really the fact, for a very eminent distiller has assured me, that notwithstanding the high price of malt spirits, more compounds have been drunk by the lower orders of people within the last half dozen years than in almost treble that time in any former period, owing to the bad quality of the porter.

dustrious insect, the board will I hope pardon my bringing to their recollection, the beautiful description given of them by that great master, Virgil, in his IV Geor. v. 149.

Nunc age, naturas apibus quas Jupiter ipse  
 Addidit, expediam: pro qua mercede, canoros  
 Curetum sonitus crepitantiaque æra secutæ,  
 Dictæo cœli regem pavere sub antro.  
 Solæ communes natos, consortia tecta  
 Urbis habent, magnisq; agitant sub legibus ævum;  
 Et patriam solæ, et certos novere penates.  
 Venturæque hyemis memores, æstate laborem  
 Experiuntur, et in mediûm quæsitæ reponunt.  
 Namque aliæ victu invigilant, et fœdere pacto  
 Exercentur agris: pars intra septa domorum  
 Narcissi lachrymâm, et lentum de cortice gluten,  
 Prima favis ponunt fundamina; deinde tenaces  
 Suspendunt ceras: aliæ, spem gentis, adultos  
 Educunt fœtus: aliæ purissima mella  
 Stipant, et liquido distendunt nectare cellas.  
 Sunt, quibus ad portas cecidit custodia sorti:  
 Inque vicem speculantur aquas et nubila cœli,  
 Aut onera accipiunt venientum, aut agmine factæ  
 Ignavum fucos pecus à præsepibus arcent.  
 Fervet opus, redolentque thymo fragrantia mella.  
 Ac veluti lentis Cyclopes fulmina massis  
 Cum properant: alii taurinis follibus auras  
 Accipiunt, redduntque: alii stridentia tingunt  
 Æra lacu: gemit impositis incudibus Ætna:  
 Illi inter sese magnâ vi brachia tollunt  
 In numerum; versantq; tenaci forcipe ferrum.  
 Non aliter (si parva licet componere magnis)  
 Cecropias innatus apes amor urget habendi,  
 Munere quamque suo. Grandæur's oppida curæ,  
 Et munire favos, et Dædala fingere tecta.  
 At fessæ multâ referunt se nocte minores,  
 Crura thymo plenæ: pascuntur et arbuta passim,  
 Et glaucas salices, çasiamq; crocumq; rubentem,  
 Et pinguem tiliam, et ferrugineos Hyacinthos.  
 Omnibus una quies operum, labor omnibus, unus.

Mane ruunt portis, nusquam mora: rursus eadem  
 Vesper ubi è pastu tandem decedere campis  
 Admonuit, tum tecta petunt, tum corpora curant.  
 Fit sonitus, mussantque oras et limina circum.  
 Post, ubi jam thalamis se composuere, siletur  
 In noctem, fessosque sopor suus occupat artus.

Pliny also, who was as great a naturalist, makes use of this language in his second book, c. 5. "Inter omnia insecta principatus apibus, et jure præcipua admiratio." And Dr. Butler in his *Fæm. Monar.* adds, "As bees serve for necessary uses, to feed the belly and heal the body, they deserve to be loved and defended by all."

These little diligent colonists are kept by most of the farmers wives, by many of the shop-keepers who have small gardens, and by almost every cottager in the county, especially those who border on heaths and commons, where the heath, (*erica vulgaris* et *tetralix*) with its purple blossoms abound. In such situations, the bee lives in a state of luxury, and the honey partakes of the colour of the flower; we also find the hives well colonized and very fruitful, and where proper attention is paid to them, the produce has been from a few hives, from twelve to fifteen pounds.

Of all the honey however which I have seen and tasted, either native or foreign, there is none equal to that which is gathered from the flowers of the lavender on Wandsworth Hill, in this county, on which large quantities of lavender have formerly been, and are now annually planted. The bees which are kept in that neighbourhood produce a honey, superior to that of any other place. The honey, as it runs from the comb without any pressure, is fragrant, but somewhat acrid, with some

yellow tinges; and seems to answer the character of the finest Narbonne. The honey about Mitcham and Mortlake is not so pure and fine, nor so fragrant, probably owing to the variety of other odoriferous flowers which are grown there, and which, inviting these insects to them, produces a variety of flavour in the honey, although the much larger portion is evidently lavender. The former appears to me to have received the essential oil of lavender, and I understand from some medical men, that in cases of the gravel, it seems to act upon the principle of the juniper and turpentine oils, which are given on those occasions; but mild from the balsamic quality of the honey.

On those heaths where the wild thyme, (*thymus serpyllum*,) and the wild marjoram, (*origanum vulgare*,) abound, the flavour of the honey is peculiarly grateful. The hyblæan honey of the ancients, was, as far as I am able to judge, the essence of the flowers of these plants. The honey which we collect from the bees which are kept in the neighbourhood of Banstead, Epsom, and Leatherhead Downs, have more or less of this exquisite sweetness.

The great art in their management seems to be to set the hives on stools as near as may be towards the south, or with a point or two to the west, that the hive may somewhat break the east wind from the door. That the hives be so secured from the inclemency of the season on the top, that no weather can penetrate it; this is done in a very simple manner, by placing a hood over the hive, made high and strong, with the best wheat or rye straw, thus; take four or five good handfuls of straw drawn out of the sheaf, beat out the corn, draw

out the ears of each handful, longer on one side than on the other; and pulling the long sides together in form of a sugar loaf or cone for casting off the rain; bind them all in one, under the ears, as fast as you can, the head is to be bound fast with a cap, which must be artificially wreathed or plaited on the top. The latinists call this covering, "*alvearia straminea operire utilissima.*"

There are three seasons of the year in which those who keep bees may take the honey, but it is seldom taken more than twice, and not very often more than once. These three seasons are May, July, and October. The honey taken at these three times of the year, will be found to be extremely different, and therefore should be kept apart. Of these the spring honey is by far the best, and should be the only kind used medicinally. The bees are in their full vigour when they collect this, and the first flowers of the year, from whence they gather it, are in their full glory. The summer honey is the next in value. That of autumn is poor and weak, and will not keep long from spoiling.

The spring honey should be procured freely from the comb, not by means of pressure, much less of heat. The combs should be taken out of the hives, and broken in four or five pieces. These should be set slanting in a cool place, for the honey to run out, and as much as will run freely, must be kept in the pan into which it was first received, tying it carefully over, and setting it in a cool quiet place.

Honey seems designed by an all wise Providence, to please the palate, and mitigate some of the cruellest maladies to which the human frame is subject. In recent colds, and coughs, in asthmas,

against the tough phlegm, hoarseness, consumption, and the stone and gravel, pure honey is a never failing present relief, if it does not effectually remove the disorder; but it should be taken in time, and continued with perseverance.

**BENEFIT CLUBS.**

However salutary these very useful societies are found to be in other places, yet in Surrey their extension has no where made any rapid progress since the passing of Mr. Rose's very valuable and laudable bill for the security of the subscribers. The few societies that exist in the country, and apart from the manufactories, are so far as I have been able to trace them, upon so contracted a scale, as to admit but of little benefit to the parties, who seem not sufficiently alive to the advantages which, when properly arranged and prudently conducted, they are known to afford. Wherever these societies are held, the farming labourer scarcely ever makes one of the number, because while young he is too thoughtless to enter into one, and when he is more advanced in years, and with a family about him, and stands in need of their assistance, he is then perhaps too old to be admitted a member. Thus have I heard many a steady man lament his want of foresight in not belonging to some benefit club in his youthful days.

In the Borough of Southwark there are several, and also among the calico printers, and there has been one of many years standing under the treasurership of Sir Robert Burnet, and of which I was upon the committee as one of the managers at its institution. The benefit which many a poor

family in the parish of Lambeth have derived from it is incalculable, and bespeaks more than any thing else the inestimable value of such institutions.

## CORN.

Towards the close of the 17th century Mr. King estimated the number of acres in England and Wales at 39 millions, and he disposed of them in the following manner, viz.

|                                                                        | <i>Acres.</i> | <i>value per acre.</i> |    |    | <i>total value.</i> |
|------------------------------------------------------------------------|---------------|------------------------|----|----|---------------------|
|                                                                        |               | £                      | s. | d. | £                   |
| Arable land .....                                                      | 9,000,000     | 0                      | 5  | 6  | 2,480,000           |
| Pasture and meadow                                                     | 12,000,000    | 0                      | 8  | 8  | 5,200,000           |
| Woods and coppices ....                                                | 3,000,000     | 0                      | 5  | 0  | 750,000             |
| Forests, parks and commons                                             | 3,000,000     | 0                      | 3  | 8  | 570,000             |
| Heaths, mountains and barren land .....                                | 10,000,000    | 0                      | 1  | 0  | 500,000             |
| Houses, homesteads, gardens, orchards, churches and church yards ..... | 1,000,000     | the land and buildings |    |    | 2,000,000           |
| Rivers, meers, lakes and ponds                                         | 500,000       |                        |    |    |                     |
| Roads, ways, and waste land                                            | 500,000       | 0                      | 0  | 0  | 50,000              |
| <hr/>                                                                  |               |                        |    |    |                     |
| 39,000,000 about 6 2 £12,000,000                                       |               |                        |    |    |                     |

The produce of the arable land he thus estimates in a year of moderate plenty.

|               | <i>Bushels.</i> |    | £ | s. | d. | <i>Value.</i>                                  |
|---------------|-----------------|----|---|----|----|------------------------------------------------|
| Wheat .....   | 14,000,000      | at | 0 | 3  | 6  | 2,450,000                                      |
| Rye .....     | 10,000,000      | —  | 0 | 2  | 6  | 1,250,000                                      |
| Barley .....  | 27,000,000      | —  | 0 | 2  | 0  | 2,700,000                                      |
| Oats .....    | 16,000,000      | —  | 0 | 1  | 6  | 1,200,000                                      |
| Peas .....    | 7,000,000       | —  | 0 | 2  | 6  | 875,000                                        |
| Beans .....   | 4,000,000       | —  | 0 | 2  | 6  | 500,000                                        |
| Vetches ..... | 1,000,000       | —  | 0 | 2  | 0  | 100,000                                        |
| <hr/>         |                 |    |   |    |    |                                                |
| 79,000,000    |                 |    |   |    |    | 0 2 3 <sup>45</sup> / <sub>16</sub> £9,075,000 |

But according to more recent calculations, such as Mr. Middleton's, the estimate will stand thus;

|                                                    | <i>Acres.</i> |
|----------------------------------------------------|---------------|
| Arable land .....                                  | 14,000,000    |
| Pasture and meadow .....                           | 21,300,000    |
| Woods and coppices .....                           | 2,000,000     |
| Forests, parks, commons and heaths, &c. ....       | 7,889,000     |
| Ho grounds, nursery gardens, pleasure grounds, &c. | 124,000       |
| Ways and waters, &c. ....                          | 1,603,000     |
|                                                    | <hr/>         |
|                                                    | * 46,916,000  |

The arable part of it is disposed in nearly the following proportions, and manner.

|                                     | <i>Acres.</i> |           | <i>Bushels.</i> | <i>s. d.</i>   | <i>Total value.</i> |
|-------------------------------------|---------------|-----------|-----------------|----------------|---------------------|
| Wheat . . .                         | 3,850,000     | producing | 77,000,000      | at 7 6 . . . . | 28,875,000          |
| Rye . . .                           | 250,000       | —         | 5,000,000       | — 4 0 . . . .  | 1,000,000           |
| Barley . . .                        | 500,000       | —         | 12,000,000      | — 3 0 . . . .  | 1,800,000           |
| Oats . . .                          | 2,000,000     | —         | 80,000,000      | — 2 6 . . . .  | 10,000,000          |
| Peas . . .                          | 250,000       | —         | 8,000,000       | — 4 0 . . . .  | 1,800,000           |
| Beans . . .                         | 250,000       | —         | 8,000,000       | — 4 0 . . . .  | 1,000,000           |
| Vetches . .                         | 100,000       | —         | 1,200,000       | — 5 0 . . . .  | 800,000             |
|                                     | <hr/>         |           | <hr/>           |                | <hr/>               |
|                                     | 7,300,000     |           | 101,200,000     | 4 4½ . . . .   | £44,475,000         |
| Subtract the former produce . . . . |               |           | 79,000,000      | 2 3 . . . .    | 9,075,000           |
|                                     |               |           | <hr/>           |                | <hr/>               |
|                                     |               |           | 112,200,000     | 2 1 . . . .    | £35,400,000         |

From this comparison of the produce of these two periods, being little more than a century, we have the very flattering satisfaction of seeing, that although we have five millions more acres in aration at this time than at the former period, yet the produce is very superior, and must be attributed entirely to a manifest improvement in our cultivation; since we see that our present growth (which indeed is more an object of national gratulation than the money price of the commodity,) exceeds

\* It is not my intention to dispute which of these two totals are the most correct, I take them as I find them.



the former by 112,200,000 bushels, or 14,025,000 quarters; and of the increased value of £35,400,000, averaging 4s. 4d. $\frac{1}{4}$  per bushel, which is more by 2s. 1d.

The products of the other parts of the soil have been set forth in another place, and as my object in this review is solely confined to grain, and to shew its importance in a political point of view, I shall proceed in that consideration.

It may not be unnecessary here to observe, that countries not overstocked with men, and so situated as to be relieved by importation, may yet suffer very greatly, and be reduced to an extreme low ebb for want of corn, unless they make some due provision against such a calamity. I have shewn by the above table, that in the article of wheat, our produce may be equal to 77,000,000 bushels, which is about nine bushels and three quarters per man, estimating the population at eight millions. This produce is equal to its fair consumption, and with very little to spare to lay by; but as a portion of this is returned to the soil as seed, another part is used in the manufacture of starch, as well as by the distillers, and those who use paste, not a little is destroyed by rats and mice in the stack, and in the barn, and a great deal is so damaged in a variety of ways, as to be of little or no use, I am inclined to think, that taking one year with the other, we do not grow enough for the absolute consumption of its inhabitants, probably by 8,000,000 bushels, or 1,000,000 quarters, or one bushel per head. Even with the assistance of all the rye that is grown in the kingdom, the produce would not be equal to our ordinary consumption.

But when we experience such calamitous seasons as 1800 and 1801, the privation of bread in poor families is a most dreadful circumstance, and points out the necessity for measures of timely precaution on the part of an attentive administration.

In Edward the third's reign, corn rose to thirteen times its common value; but in the years just mentioned it only quadrupled it. It has been asserted, that even in a plentiful year, such as 1803, there was not more than three or four months stock of grain at the time of the harvest of 1804, and if that is the case, in a middling year it does not extend beyond one month, if it does so much, and assisted as it may be by a considerable importation. What then can we expect from an indifferent season but to depend upon importation for our support? This is a most serious crisis! It is observed, that the one tenth deficiency in the harvest, may raise the price of corn three tenths; two tenths to eight tenths, three tenths to two six tenths, four tenths to two eight tenths, five tenths to four five tenths, so that should it rise to treble the common rate, it is but fair to presume, that we want above a third of the common produce; and if we should want five tenths or half the common produce, the price would rise to five times the common rate.

Foreigners who grow but small quantities of corn, are obliged to resort to other countries for assistance; they lay in great store in public granaries and magazines when the crops on the Continent are in greatest abundance, and buy but scantily in years of greater scarcity; by such precautions as these, they are enabled to supply the inhabitants at

something like one general and even price in every year; it is never in such places very cheap, nor very dear.

The Dutch, who are wary to a proverb, practise this salutary measure; they are thus enabled to sell us our own corn upon their terms in years of scarcity, because we have not the prudence and foresight to make the same provision. What they gain by such traffic, is undoubtedly a dead loss to England. If, therefore, they can afford to let their money lie idle for a time, pay freight backward and forward, and store room, and yet be gainers by selling us our own produce in a dearer market, why should we not either increase our growth to such an extent as to make such purchases at no period necessary, or secure our own corn within our country in public storehouses and granaries in times of great plenty, in such quantities as may be sufficient for one year's demand, over and above the regular annual consumption? I confess I can see no good reason against the measure whatever, but a great deal of precautionary wisdom; at least, it should be done until such times as by an increased cultivation the supply even in indifferent seasons should be fully equal to meet the most extraordinary demand.

It was a remark made by that sound politician Sir William Petty, that "when corn is extremely plentiful, the labour of the poor is proportionably dear, and scarcely to be had at all, so licentious are they who labour only to eat, or rather to drink. Wherefore, when so many acres sown with corn, as do usually produce a sufficient store for the nation, shall produce perhaps double to what

is expected or necessary ; it seems not unreasonable that this common blessing should be applied to the common good, and consequently, that such surplusage of corn should be sent to the public store-houses, from thence to be disposed of to the best advantage of the public." "To omit therefore, what the common necessities seem to require, and to commit what we ought not to do, is one and the same thing." *Richelieu.*

## FAGGOTS.

In my dissertation on underwoods, I shall remark the difference which some sort of woods make, in burning a kiln of lime, or in the manufacture of charcoal. I there say, that the heavier woods, such as oaks, chesnuts, and ash, make stronger coal and will take fewer faggots to burn the kiln, than alder, hazle, sawlow, and the like ; but I was not aware of a phenomenon which, though the same thing is remarked in the timber under that article, I have since discovered in faggots, that some soils make a great difference in the quality even of the same articles. For example, of the faggots which are made between Godstone and New Chapel, of the same bulk, of the same number of years growth, and of the same species with those grown between the latter place, and Fellbridge, (the extent of the county) it will require at least 100 more of the former to burn the same kiln of lime than it does of those from the latter part of the county.

I have particularly examined into this circumstance, and I am of opinion that it proceeds from this cause ; that the soil for the first five or six

miles, or until you arrive at the Chapel (as it is usually called) is a deep argillaceous loam, the substratum a retentive clay. If the coppice be well planted, they will shoot in 14 years from 16 to 20 feet; some more, some less, according to circumstances. Between the further distance, the soil is of a more silicious or sandy loam, upon the hill very much so; in 14 years they will not exceed from 12 to 15 feet, and in some places scarcely so much. The former wood, although of the same nature, and perhaps somewhat bigger bulk, will be porous and light, while the latter will be close jointed, close grained, and ponderous, and consequently will be a longer time in burning, will cast a greater heat, and therefore will require fewer faggots to burn the same quantity of chalk. But I proved that it was so, for in taking two sticks of oak, as near of the same circumference as possible, out of two faggots, the produce of each division, and of the same growth, I sawed exactly 12 inches off each, and weighed them, the result was about two ounces in favour of the sandy soil; I then put each piece on the hob of a bath stove, in my study, and shifted them each day by way of changing places, that each might have a fair chance, and at the expiration of eight days, the two ounces had increased to above three, which plainly proved that the quantity of sap or moisture was greater in the one than in the other, which had distended the vessels at the same time that it encouraged the growth: nor would the wood burn so well, until all the sap was evaporated, thereby making the operation of calcination so much the more tedious.

The closer and thicker the coppice the worse the

faggots for the buyer, though not for the seller. "If you leave your stables too thick," says Lord Verulam, "you shall never have clean underwood but shrubs and bushes." Indeed they should be proportioned to the quality of the soil in all cases, for fewer stools will be sufficient on a good soil, than on that which is indifferent.

The price of faggots in the eastern part of the county is become a very serious thing to the poor and middling classes, who have to buy all they require to burn, the price by the 100 is this winter 30s. but by the bundle the poor pay 4d. each,\* nor is this all, for the dearer they are, the more inferior in quality, and the less in bulk, you have for money. Now, there is a regular assize for them, but which is in very few instances attended to; it is as follows: "Faggots for fuel are required to be in compass, besides the knot of the bond, 24 inches of assize; and every faggot stick within the bond shall contain full three feet of assize, except only one stick, which is to be but one foot long, to stop or harden the binding."

Whoever has attended to the making up these faggots, cannot but have remarked the manner in which they are done, and the opportunity there is for fraud. The workman when he has bound up the faggot, trims off the superfluous branches from the sides and end to make it neat, and these with

\* A faggot at 4d. which will scarcely boil a pot, a quartern loaf at 1s. 4d. which is not sufficient for a hard working labourer and his wife, and two or three children for a day, an ounce and half of butter 1d. one ounce of tea for two days 4d. or 2d. per day; and if he earns 12s. per week, there is one penny over to buy cloaths and pay rent. Need we wonder if such people are dishonest!

any other small spray he adds to the middle of the next; but such trash can be of no advantage to the faggot, although it serves to fill it up, and to swell it out; and as such small stuff cannot be considered as proper faggotting, it ought always to be left out; in short nothing should be put in but such as is of a proper and legal assize if they are intended for sale.

Even by so doing, and letting all the small rot on the ground, I am persuaded that both landlord and tenant would be gainers thereby, inasmuch as by their rotting they would speedily become vegetable mould, which will surprisingly enrich the ground, since we know, that any rotten wood, even in moderate quantity, will convert a very ordinary soil into good garden mould. We always see the land where wood stacks have stood, enriched to a surprising degree by them; every gardener or florist is glad to pay dear for it; and the same advantage will be, wherever wood of any kind is left to moulder and rot upon the ground.

**TIMBER.**—Might it not be worth while, and would it not be attended with great national benefit, to have the timber in every parish throughout the kingdom surveyed, numbered, and measured? I mean all such as is above 10 feet meetings; it might be done with sufficient accuracy by any country carpenter within the parish; and those who are well accustomed to look over standing timber, can tell the contents of a tree near enough by the sight; if not, the actual admeasurement would neither be a long, nor an expensive undertaking. The object I have in view by the measure is, that government, who I have reason to believe, are at this

time unacquainted with the resources of the country, as to oak, elm, beech, and ash, would come at the absolute state thereof, and they would be enabled to take such measures of precaution as to them might seem meet. Such a plan done once a year at an expence of a few hundred pounds would in my opinion be of incalculable benefit.

I submit however the idea to the board with deference.

#### FISH.

In the parish of Godstone, and at a short distance from the church, Mr. Collins has some capital stews for the breeding and fattening of carp. On an average of years, he sends to London not less than 4000, which are very large and fine. It is computed that he has not fewer at this time than 1800 ready for market, besides those which he has sold, which amount to near 3000. The soil, the situation, and the water, seems peculiarly calculated for them, since they increase rapidly, and grow very fast, and no doubt would come to very large weights if they were long enough kept.

The London markets are also supplied from stews in the western part of the county.

#### FORESTALLING, REGRATING, &c.

During the melancholy scarcity of corn in the years 1801 and 1802, every person exclaimed against the forestallers, regraters, and ingrossers of corn; and indeed there was reason to believe that the clamour was but too well founded. It has generally been observed, that when the common people have been distressed, when they have wanted



the common necessities of life, there has been some natural cause, as unfavourable seasons, bad harvests, &c. This was literally what happened in the seasons I have just alluded to, and the consequence as might be expected was an increase of price, beyond what had been known for a vast number of years: scarce however as was the commodity, it was greatly increased by the vile machinations and contrivances of the forestaller; and although few convictions took place at that time, it is a well known fact, that much of the corn that was lodged in the neighbourhood of Millbank, and in a variety of old houses at the back of Westminster Abbey, was either totally spoiled, or greatly reduced in quality and price, by long keeping, because the owners thereof did not think proper to bring it to market.

The seasons of 1802 and 1803 were more propitious, and in the latter season the crop was highly flattering, yet as those two crops did not afford, we have reason to believe, a greater surplusage than usual, still the price of corn felt a depression, (and that during a period of war) such as has not before been known. The cause of it however is well understood, and left the forestaller quite out of the question, at least so far as respects the unground corn. But far otherwise was the case of the miller and mealman, because it is a well authenticated fact that the price of wheat and the price of flour bore no sort of proportion to each other, at least in the country markets. If the price of wheat was selling at £12 per load of 5 quarters, the price of flour was selling by the mealman in all the villages, and some of the towns at the rate of

£15 per load, and in some places more. The farmer was losing money at this price, after toiling and sweating to get a crop, while the mealman was enriching himself at the expence of the public.

Trade and commerce have ever been deemed by legislators objects of the highest importance, those branches especially which concern articles necessary for the sustenance of man. Attempts to interrupt or impede commerce of this kind, have in all ages and in all nations, as by common consent, been resisted and guarded against. Thus it was among the Grecians, for by the laws of Athens, the practice of exporting corn, or even of secreting or hoarding it up, was punishable with death. By the Julian law, whoever conspired to raise the price of victuals, such as corn, oil, bread, butchers meat, salt, whether by detention of vessels, subtraction or suppression of provisions, or other similar mal-practices, were punished by pecuniary mulct.

Among the ancient Swedes and Goths no purchase could take place, unless before witnesses. So in Lombardy, the Emperor Pepin, and King Luitprand, sanctioned laws, that none should purchase horses, oxen, beasts of the plough, or other articles, unless in the presence of witnesses. By the laws of Athelstan, all sales of any commodity above the value of 20*d.* were to be made publicly; and Canute confined them to so low a sum as 4*d.* whether of cattle or goods. Æthelred enacted, that the purchasers of cattle or sheep, should preserve the head and hide for the space of three days before they sold them. The buyers of corn, cattle, &c. in fairs and markets, paid a toll to the lord or

owner of the market, in testimony that the contracts were lawfully made.

The institution of fairs and markets in the early period of our history, must be regarded as a wise regulation, for thereby merchants, traders, and the country at large, might be supplied with such commodities as they wanted, at a particular mart, without the trouble and loss of time necessarily attendant on travelling. The law considering it a point of great public policy, that such fairs and markets should be replenished and well furnished with all manner of commodities (especially the articles of food) for the necessary support and use of the people; to that end ordained, that all sales and contracts of any thing saleable in open fairs and markets, should be binding as well between the parties as those that might claim right thereto.

Herein the law had a two-fold object; first, as it regarded a change of property in goods, which never took place, unless sales and contracts in markets were originally and wholly made there, openly and without fraud, as the preceding references evince. Secondly, what was equally important with the former, it had in view the prevention of forestalling; an offence so destructive to public trade, that a forestaller has been termed in one of our ancient statutes a public enemy to the commonwealth.

Forestaller, is he who buys either by agent or by any other means, corn, or cattle in its way either to a market or fair, or shall by motion, or letter, message, or otherwise, enhance the price, or prevent the sale thereof.

**Regrater**, is he who buys corn at a fair or market, and sells it again within four miles thereof.

**Ingrosser**, is he who by buying, contracting, or otherwise gets into his hands, corn or dead victual, growing in the field, with intent to sell the same again; and shall be reputed an unlawful ingrosser.

From this view of the matter it will appear, that our ancestors have been ever careful to guard the subject against the evil practices of these sort of people; but as the wisest statutes lose their force by inattention and neglect, so it happens in the present instance. In another part of this report I have given the opinions of several characters of the highest consequence in the western part of the county, as to the existence of the evil of forestalling, and the great length to which it is carried. In looking into Mr. Illingsworth's very elaborate work on this subject, and which every magistrate ought to be in possession of; the board will see that so long ago as the 22d March, in the year 1733, the inhabitants of Haslemere, one of the most ancient boroughs in this county, presented a petition to the house of commons, against the abuses of millers and mealmen, combining to fix the price and measure of corn; and compelling the farmers to carry the same to their houses, whereby the trade of several market towns hath been destroyed. "The petition was referred to a committee, who reported that the mealmen and millers have combined together to fix the price of corn brought to the market, and thereby engrossed the whole trade thereof.

"That such combination, and their forestalling of corn markets, tend very much to the prejudice

of the farmers using such markets, and to the oppression of the poor, and ought to be redressed."

On the 25th April, 1766, Mr. John Warrington, a considerable farmer at Morden, in this county, proved before the corn committee of the house of commons, that persons who are called jobbers, constantly attend the corn market in London, and buy great quantities of corn, which they lay up in their granaries, in order to bring to market again.

That these persons, by their agents, buy great quantities of oats of the farmers about harvest time, when the farmers are in want of money, which they lay up in granaries in the country, and bring to town sparingly, as they are wanted, by which practice they keep up the price.

The witness mentioned the names of several persons who had bought up corn at the market in London, and laid it up in granaries in the manner he had mentioned.

There were other circumstances which he proved as to the existence of the evil, but I have reported enough of it to establish a position, that this county has been many years a prey to this Gorgonic monster.

In the practice of forestalling, regrating, and ingrossing of cattle, perhaps there is not a fair in the county where it is not more or less done, either in cattle, in sheep, in swine, or in horses, or what is not unlikely, in them all, by jobbers and dealers. In the borough, which though out of the county, is nevertheless both the market and fair for the eastern farmers; it is impossible to attend the latter

without being a witness to the practice of regrating all the day long.

But the great sink of monopoly, of forestalling, and regrating, is to be found at Smithfield, here the farmer and grazier are robbed, and the public plundered. I have been too many years connected with two of the oldest and greatest salesmen there, not to be thoroughly acquainted with all their diabolical plans. But for the present purpose, I have been assured by the retail cutting butchers of the Borough of Southwark, who are a numerous, and many of them a respectable body of men, that the plan is carried on at Smithfield, by the carcase butchers, in the most systematic manner imaginable; and that these people in combination with a set of jobbers, so ingross the market, as to oblige the retail butcher to have recourse either to the jobber or the carcase butcher for a supply of cattle, which they formerly had an opportunity of buying alive at the first hand. The former by attending the several markets within 20 miles of London, get the greater part, and all the prime stock into their hands; feeding the markets as they please, and making their own prices; whereby the public are great sufferers; while the profit, which ought to go to the feeder, is monopolized by this middle man; the feeder having nothing equivalent to the price per stone which his cattle might have sold for, and would have sold for, to the retail cutting butchers, but for the intervention of the jobbers; and especially on a large but wet market day, when cattle and sheep are sure to sell low; though the middle man takes care to sell them high.

Again, many of the salesmen themselves are job-

bers, (we have one in this town,) and many occupy marsh land on the coast of Essex and Kent, and although these men may not buy their employers stock, they can and do buy of one another at a low market.

The retail butchers are firmly of opinion, that had the bill which was presented to the honourable the House of Commons, on the 2d of May, 1797, by Mr. Mainwaring, been passed into a law, but which was unfortunately lost on the 29th June following, the price of butchers meat would at this time have been considerably lower, without at all interfering with, or lessening the present and fair profits of the feeder.

I know some opulent farmers who have gone out of Kent to attend Smithfield market when their cattle has been sent there. The salesmen, the jobbers, the carcase butchers, all know what they attend for, and take measures accordingly. If the salesman is a secret partner in the disposal of any other cattle brought to market, he will take care to ask more than the real value of the feeder's cattle, not only to keep up the price, but to get rid of his own; or perhaps with other men in the secret, he makes a false sale of his own at a lower price, much less than the value, in order that they may have an opportunity of buying those of the feeder who is present, after the same rate. If the feeder finds himself disappointed, as there are very few but do, the salesman's excuse is, the demand is that day very short, or the market is glutted; and therefore the feeder, rather than take them away, consents to their being sold to these sort of people, who are always in waiting, at a much lower price

than what he would have had in all probability had he not been present. One of the gentlemen to whom I allude, a Mr. Richardson, who farms largely in Kent, and who accompanied his stock to Smithfield, brought some of them away, because they did not come up to the price he had been offered for them between 40 and 50 miles in the country; they were kept at a friend's near London, and the week following they were sent again, and he attended; the same farce was performed, and he was obliged to take less money that Monday than he might have had the Monday preceding.

So much for Smithfield.

At the hay-markets in London they have their tricks also; if you are in the habit of sending your hay and straw to town from any distant part of the country, and it becomes an object to you to lose no time in the sale of this commodity, in order that your team may take in its fresh loading to return home; the salesman has a chapman for it directly; if it is worth buying, and at such a price as his chapman is instructed to bid for it in the hearing of your servant. The waggon is then unloaded into another cart or waggon, or drawn into some neighbouring yard, where after being reloaded, it is again exposed in the market, or it is sold to some gentleman's groom or coachman, at ten or more shillings profit per load, while standing in the yard. Or the commodity never goes to market at all, but is directed to be taken to some inn or yard which the salesman has contracted to furnish, he paying as he says the full market price, but which I have known to be full five shillings under.



Whether the practice, as it is now established, of buying corn by sample, is or is not prejudicial to the community, I shall not presume to determine; it has its convenience even should it be detrimental; but the convenience, however great it may be to the few, should never be the means of oppression to the many. It is but seldom indeed, that the miller and the farmer combine to raise the price of corn, but should such an event take place only for a short time, the markets would directly become forestalled, since the mealman would then sell his flour at what price he pleases to the baker, as well as to those families who make their own bread.

What is the language of the great miller at this and other markets? he boldly says in the hearing of buyers and sellers, at his first coming into the market room, my price to day is so and so, and no more do I mean to give; this is a clue to the other millers, and a hint to the jobbers, who will do the same if they can. When the miller is rich enough to turn mealman, he refuses the use of his mill to both baker and consumer, and by that means he gets his own price for his flour, and he may adulterate it with pea or even bean meal, as it is a known fact that a miller in this neighbourhood uniformly does when wheat is above a certain price.

We have in this county millers who have several corn mills in their own occupation, or in which they are concerned as principal partners; and some of them carry on other trades and manufactories besides to an immense extent; such are to be found on the Wandle. Is not this forestalling, and within the meaning of the act? If such men are situate upon such streams as the Wey, where

they can attend the Guildford, the Kingston, the Farnham, the Haslemere, the Chertsey, and the London markets, or three or four of them, such men can and do command the price of all the corn and flour that is sold in those parts; and they keep several waggons continually carrying the grist into all the towns and villages in those neighbourhoods, monopolizing the bakeries by the credit which they afford to the bakers; and the surplus they serve to the London bakers in the same way; keeping thereby always an artificial scarcity in the country, although the produce on the land may have been ever so great.

Both corn and flour would be a great deal cheaper here, if such corn as is sold in this market did not find its way to London, either in its native state, or as flour; consequently we are only fed from hand to mouth, and that too at the caprice of the miller.

The distilleries and the starch-makers are causes of an artificial scarcity; they are either all buyers, or they are, in their language, overstocked; and as they make a great deal of flour, the wheat is either returned in that state to market, if the price of meal suits them, or it is converted into spirit and starch. But as their capitals are very great, and their store-houses large, the purchases or sales of three or four such houses in combination can sink or raise the price, even in such a place as the corn exchange in London.

Allowing that all the wheat which the distilleries grind is converted conjunctly with malt into spirit, the quantity must be immense; I have endeavoured with much earnestness to ascertain the precise

quantity produced when they are at full work. It appears that in the year 1803, the quantity of spirits for which duty was paid in London only, amounted to 11,300,000 gallons, if to this we add the quantities made by the rest of the distilleries throughout the kingdom, to say nothing of the private stills, perhaps the total quantity may be something like 15,000,000 gallons. To make this quantity, I compute that it requires about 10,000 quarters of wheat. The proportion which the wheat meal bears to that of malt meal is about three of the former to ten parts of the latter. If I am right in this calculation, it will appear, that as much wheat is consumed in destroying the constitution of the lower orders of people as would support and keep 10,000 industrious men in perfect health.

It is true, when wheat is above a certain price, the distillers are prohibited working, but as that does not often happen, and as it is the interest of the minister of the day that they should work, the quantity of wheat which they take off from the market amounts to a monopoly. Should they however not work, it does not prevent their becoming mealmen and grinding wheat, which when ground, the greatness of their capital enables them to keep back until the rise in the market makes it worth their while to sell.

The quantity of raw spirits consumed in this country is I am afraid increasing in spite of the heavy duties, owing to the badness of the London porter. The increase of an article so destructive to the constitution cannot but be lamented; and that it must be so, is deduced from this circumstance; that at least two-thirds of the hogs fatted

at the distilleries are found to have their livers almost eat away.

A. D. 1533, 25 Henry VIII. This year a statute was passed limiting the number of sheep to 2000 in any one person's possession, and prohibiting any person from holding more than two farms. It appears that in those days it was not unusual for one man to have 24,000, some 20, some 10, some 6, some 5000, some more, some less. I do not believe that any of our Surrey farmers exceed the first limitation; but with respect to farms, we have many that come within the meaning of that prohibition, if by farm is meant any small or large quantity of land, from 20 acres to 500, that may have been occupied by a man, and from the produce of which he gets a sort of living. The term ingrossing of farms is too vague and undefined.

In the article of oak timber I have said that I could not find any act that made it penal in any person to buy bark, other than the tanners, but I see that under the title of regrating and ingrossing, there is an act in the 1st. Jac. I. c. 22, sec. 19, which ordains that no person shall regrate, ingross, or get into their hands, by buying, contracting, or promise-making, any oaken bark before it be stripped, or after, with intent to sell again; upon pain of forfeiture of all such bark so by him or them regrated, ingrossed, or bought, or the full value thereof.

In the third year of the same reign, no person shall buy lamb skins, or coney skins, with a view to sell again in small quantities.

In the same reign, tanners forestalling hides are

subject to a penalty of 6s. 8d. for every hide or skin so bought or forestalled.

Wood, coals, or fuel, by the statute of 7 Ed. VI. c. 7<sup>th</sup> are only to be sold wholesale or retail to the consumer.

Maltsters, if they buy at unreasonable rates, they shall be within the statute of ingrossers.

Beans and peas being a mixed grain, the ingrossing of either is within the statute.

Ingrossing of cattle is also penal.

Inn-keepers may be indicted for selling oats at unreasonable rates, as was the case with one Johnson, an inn-keeper in Holborn.

I have been strongly importuned to recommend to the notice of the Board a species of hand mill, which I am informed is in general use throughout India, and is chiefly worked by women. These mills are on the most simple construction, and can be managed with very little labour. In the remote parts of Scotland and Ireland I believe something of the same kind is used in every family, and I am assured that the meal ground by them has a much finer flavour than such as is manufactured in large mills. If among our poor, who now complain with so much reason of the frauds and extortions of the millers, something of this nature could be introduced, it would be a most valuable acquisition.

Does not ingrossing public houses, for the purposes for which they are either bought or rented, come within the meaning of the act? it would be a good thing if this matter was taken up in a proper manner.

GUIDE POSTS.

When a traveller sets out on a journey, whether he be a pedestrian, or an equestrian, there are three things necessary for his comfort and convenience, besides his mere equipments; these are, good roads, good accommodations, and a ready means of finding his way from one part of the country to the other, without the risk of going miles out of his road.

In the course of this survey, I have had frequent opportunities of putting these points to the test in this county, and perhaps more than has fallen to the lot of many men; and I must confess, if I had not been well convinced to the contrary, I might many times have fancied myself in some of the most remote parts of the kingdom, notwithstanding this county may be said to be the most admired, the most fashionable, the most healthy, and as much frequented as any in the kingdom. The cross roads at a distance from the metropolis are everywhere shamefully neglected; the accommodations therein are the haunts of the smuggler and the riotous, and scarce one of them has a guide, a direction, or a way post, (for these are the provincial terms for the same thing) and some of the lanes are in winter so under water as to make them dangerous because they have no water marks.

If we travel from Croydon to Westerham in Kent, there is no way post to instruct us which way to turn, although it is turnpike; the same may be said to Meastham, to Chaldon, or to Chipsted. If we want to go from Warlingham or Limpsfield to Tatesfield, we must enquire all along.

the road, for we see no post to inform us. If we go from Oxted or Limpsfield to Crowhurst and Lingfield, we may be lost in the mud, or be drowned in the river, for we are in the same predicament; from Blue Anchor turnpike house to Lingfield, from Dorman's Land to Eden Bridge, or to East Grinstead, it is just the same.

From Horley to Charlwood, Newdigate, Capel, Ockley, Ewhurst, or any of the cross roads in that part of the county, the difficulty in finding the way so as to steer clear of water and quicksands is such that I have been obliged to take guides, especially in the winter months.

From Dorking, through Shire, Albury, Shalford, to Guildford, there is not one post all the way.— From Godalming or Whitley to Frensham, from Guildford to Worplesdon, Purbright to Frimley, over Bagshot Heath; from Bagshot to Purford, Woking, Send, Wistley, Ripley, to Chertsey, scarce one in all this part of the country, and if there happens to be one, it is scarcely legible; from Weybridge, Walton to Esher, from Kingston to Richmond, there is none; nor from Cobham to Leatherhead.

As far as it relates to the inhabitants of those neighbourhoods, the want of direction posts may be of no moment, because they are sufficiently acquainted with the roads; but the Board will see, that if a person is travelling through a country in wet or snowy and severe weather, which happened to be my case several times on foot, it is of material consequence to him to find his way readily from place to place, and not be bewildered with intersecting roads, on commons, heaths, or downs, and neither posts nor people to prevent his going miles

out of the way, to the hazard of his life, especially if he should be benighted in consequence of such inattentions.

How does it happen that neither the magistrates, the grand jury, nor the high constables of the several hundreds, take cognizance of these things? Is it because they want to be told or reminded, that there is an act of parliament still in force, which orders those things, of which the following is a copy?

“ The justices, at a special sessions, shall issue their precept to the surveyor, where several highways meet, and there is no sufficient direction post or stone already fixed or erected, requiring him forthwith to cause to be erected or fixed, in the most convenient place where such ways meet, a stone or post, with inscriptions thereon, in large legible letters, painted on each side thereof, containing the name or names of the next market town, or towns, or other considerable place or places to which the said highway leads; and also at the several approaches or entrances to such parts of any highway as are subject to deep and dangerous floods, graduated stones or posts denoting the depth of water in the deepest part of the same, and likewise such direction posts or stones as the said justice shall judge to be necessary for the guiding of travellers in the best and safest tract through the said floods of waters; and if he shall refuse or neglect, for the space of three months, to cause such stones or posts to be fixed, he shall forfeit 20s.”

13. G. III. c. 78. s. 26.

By the aforesaid act a power is given to the surveyors to lay out their own money in erecting guide



posts, making drains, and purchasing materials for repairs, and they are to be reimbursed by a rate to be allowed at a special sessions. If these things are neglected, not only the parish may be indicted for such neglect of the surveyor, but the surveyor, after his acceptance of the office, is liable to a penalty not exceeding five pounds, nor less than 10s. at the discretion of the justice or justices having jurisdiction therein. See Burn, Vol. II. p. 638.

It is certainly the duty of the high constables to attend to these points, and to present them at the special sessions.

Many of the planks across streams are frequently carried away during floods, they ought to be immediately attended to.

The public houses on the bye-roads, and some on the high roads, are frequently so bad, and so occupied by licentious people, that it is dangerous to put one's head in them; wherever there is not sufficient business to enable the people to keep them decent, they ought to be suppressed.

The names of the several towns and villages should be fixed up at each end of them.

#### POOR.

It has been attempted by several parishes to consolidate or unite three or four, or more of them, and to farm out their poor; the parishes of Blechingly, Nutfield, Horley, and Reigate, tried this scheme, and erected a convenient building on a very suitable part of Red Hill common; but owing to some mismanagement in the directors or governors, I do not find that it has ever answered the expectation of

the parties, for the rates were in 1803 & 4 at 7s. in the pound rack rent.

The parish of Whitley also farm out their poor, and pay to the contractor 3s. 6d. per week per head, man, woman, or child, and they agree to pay him that sum for 30 in the house, whether there are that number or not. Their rates were, before they adopted this plan, viz. in 1801 and 2, at 32s. and 34s. in the pound, at two-thirds of the rack rent; since they have farmed their poor, they have reduced their rates to 12s. at two-thirds, and they are in hopes by good management they will be able to bring them still lower.

The parish of Godstone pursued a very laudable piece of economy during the unparalleled crisis of 1801 and 2. The principal inhabitants made it their business to find out the actual consumption of each poor family in the article of grist per week. They then contracted with the shop keepers to supply all those families with the best, at the old and former prices; the parish making up the deficiency to the shop keeper, according to the prices of the London or Croydon markets in every week. By which means the poor were supplied equally well as if no advance whatever had taken place in the price of corn; no advance of wages followed as in other places; the parish had no great addition made to their rate, because all the poor were employed as heretofore, and all parties were satisfied with the regulations.

#### STONES.

Upon all the chalky hills of the county innumerable stones are found, some of them flint, others

calcareous. In some parishes, such as Croydon, Catterham, Warlingham, Tatesfield, Titsey, Limpsfield, Oxted, Meastham, Leatherhead, &c. &c. they are collected for the repairs of the turnpike and parish roads; but where the flints are of any magnitude, and in any quantity, they are collected as an article of traffic to be hereafter exported to Newcastle, for the glass manufactories. Others again have them picked off the ground, because they are found to obstruct the progress of the plough, and when the land is in clover or sainfoin, they are a hindrance to the mower. In their obstructions to the plough, the inconvenience which they occasion in that part of the county which borders on Kent, is very considerable, and they create an everlasting expence in new setting the coulter and shares, and tines. But nevertheless, it may be a question how far it may be prudent to remove or disencumber the earth of many of them from the surface because it seems to be admitted from the earliest ages, that stones not only afford shelter to the young plants, but they retard the exhalation of the moisture from the ground. Thus Virgil in his 2d. Georg. v. 351 and 2.

— Hoc effusus munimen ad imbres :

Hoc, ubi hiulca siti findit canis æstifer arva.

The Bishop of Llandaff says the crop of corn would probably be less if these stones were removed, for they are serviceable not only in sheltering the first germs of the plant from cutting winds, but they impede the escape of moisture from the earth; the ascending vapour strikes upon that surface of the

stone which is contiguous to the earth, and is thereby condensed, and thus its further ascent is for a time at least prevented. Vol. III. p. 62.

Mr. Evelyn was of opinion, that farmers did much injury to their land by the removal of the stones, because it exposes the land to too much heat and cold. This expression of his can only be meant in certain cases; for I apprehend if these stones are flint and large, they not only obstruct the operations of the plough, but they retain perhaps too much moisture on that sort of land which is often very heavy, such as part of Warlingham. Of this opinion was the late Sir John Gresham, of Titsey, whose estates were very considerable in that country, and all of them more or less covered with stones. But if as he said these stones were calcareous, be their size what they may, and in whatever quantities, they ought not to be removed; and I have seen spots in his grounds (generally very shallow and very poor) extremely fertile, although they seemed to consist of little else than small stones of flint and chalk.

On such lands as the dry sandy parts of Godstone, Tanridge, Nutfield, Reigate, &c.; the stones, I have no doubt, tend to keep the soil moist, and prevent its being blown away in a very dry time; because they not only retain, but attract humidity; but where the land is a strong heavy argillaceous loam, as in Warlingham before mentioned, there a superabundance does injury, because they tend to bind such soils more closely together, and they detain the moisture so long, as to keep the plants in a perishing state, in a moist spring and summer;

and after such a period of wet, if the summer proves scorching, and the autumn dry, it is almost impossible to break up the land, until it has again been swoln with rain.

With respect to the vegetation of stones, the question is of no other service to us, than as it tends to prove the necessity for removing a greater or lesser proportion of those which may already be superabundant on the stiffer soils: On the calcareous soils it may be no less necessary, because as sand and chalk will form a cement by running together, and as there is so large a portion of silex in flint, viz. 97 parts out of 100, according to Klaproth, p. 42, the more these flints are broken and reduced, the more they tend to cement the surface.

The bishop of Llandaff gives a sort of tacit admission to the growth of stones; and it is evident that it must be so, because fields and commons, that formerly were entirely dug over for gravel in the neighbourhood of London, have been dug over again with success; and because, on the hills, let the ground be picked over ever so clean from year to year, and for many years together, yet without ploughing deeper to bring up fresh ones, every time the plough goes in the number brought to the surface scarce appears less than before any were picked off and carried away. Linnaeus says, "*Lapides crescunt, vegetabilia crescunt et vivunt, animalia crescunt, vivunt et sentiunt,*" and this is conformable with the doctrines of Aristotle, Pliny, Jungius, and others.

## TITHES.

I have in a former part of the volume entered a good deal into the detail of this subject, and I am concerned to say that it seems almost inexhaustible.

I have lately learnt, with great sorrow, (for I feel interested in every thing that relates to this subject,) that in consequence of some hints thrown out by the rector of Oxted parish, the farmers have come to a resolution to lay all their land down to grass, and have actually begun to put this plan into execution.

One part of the parish had nearly gone to law last year about the tithes. If, therefore, such resolutions as these were to prevail generally throughout the kingdom, (and the farmers in Surrey seem unanimous in resisting every tithe exaction) what would become of the poor?

The parishioners of Lingfield were in a ferment the whole of last summer, and many of them consulted me respecting their small tithes, which are still unsettled, though some of the farmers have acceded to the demanded composition. Mr. Smith of Wilderwick is of opinion, that a composition of 2s. 6d. per week for fatting beasts, (which is a shocking thing, when cattle, and oil cake and other provender are so dear,) one shilling for two yearlings, and nine pence for twelvemonthings is a fair modus.

In the parish of Dunsfold a great deal of the land is laid down to pasture on account of the tithes.

I have been informed of so extraordinary a cir-

cumstance in the parish of Isfield in Sussex, respecting tithes, that I cannot resist mentioning it; but I do not pledge myself for its veracity, though asserted in the presence of several people by the farmer himself, whom I am told bears a respectable character. His farm is rented at £115. 10s. per annum, and when he first took it the tithe amounted only to £18. 4s. 6d. per annum; by improved cultivation at a great expence, and by the growth of hops, his tithe has been so raised upon him, that he has lately paid near £100 per annum; this added to the poors' rate at 23s. 6d. in the pound, added to other taxes, labour and all the outgoings of his farm, he found upon winding up his accounts at the end of the year he had only £50 left to defray his household expences, although he admitted he had made seven rents of the farm. The consequence was that he could not live by his business, and therefore was going to leave the farm before he was entirely ruined. If this statement be true, it speaks for itself.

Gracious heaven ! do we live in a land of liberty where superstition and bigotry no longer fetter our understandings, and yet are subject everlastingly to such unparalleled exactions as these: to support what? Not the clergyman of the place, for he deserves ten times more than he receives; but to fill the pocket of the lay impropiator; and was it even the pastor, will not such exactions drive religion out of the country? Every benevolent mind must shudder at the resistance which so many parishes in the county are making against the demands of tithes. It cannot but arrest the attention of the legislature, when they are informed, that in this county not

fewer than 4000 acres, \* but probably 8000 acres, may be diverted from the growth of corn pending these disputes.

In the parish of Oxted it was not customary to rate the tithes of the clergyman to the poor rates, so long as he accepted, and was satisfied with a fair and equitable composition from the whole parish; but if he saw one or more farmers who under that sanction were greatly improving their farms, and he thought he was entitled to wave this composition, and to demand a greater, there is no question in my mind but he immediately subjected himself to the poors' rate.

In the Luggershall Tithe Cause, which was tried in the Court of Exchequer in the spring of 1804, and determined in favour of the minister, it was clear that the clergyman was improperly rated, so long as the parish consented to a composition in lieu of taking the tithes in kind, but as soon as he took them in kind, or dissolved that contract, he became liable to be rated, unless the parish and he agreed otherwise.

Something ought to be done to quiet the minds of the cultivators of the soil, we cannot do without

\* If my foundation is correct that 4000 acres less corn is likely to be grown in this county for the next two, three, or more years, and supposing that on the average of each county, something like 1000 acres should be diverted from arable into a temporary lay, we shall have nearly 52,000 acres of produce less of corn; and reckoning three quarters as a medium return of each sort of grain, the deficiency in wheat only to be supplied from other countries abroad will be at least 16,000 quarters; and, this quantity ought to be sufficient to supply 16,000 people. Can any stronger argument be necessary to be adduced against the policy of tithes?



them, they ought to be cherished and encouraged instead of being oppressed; whatever impositions we lay upon them ought to be laid evenly and uniformly, and not for one parish to pay the tenth of every improvement, while another does not pay one fifth. By this attention every thing would come more evenly to market; but if they must be oppressed, the burthen will in some shape or other fall upon the public, be it light or be it heavy. The clergy ought to be placed above the possibility of a dispute with their parishioners, for most true it is "that whatever weakens the governors of the church, takes away from the civil power a part of its strength, and shakes the whole constitution." *Lyttleton.*

#### VERMIN.

Sir James Wright has laid before the public a calculation tending to prove that the damage done by rats in corn, amounts to no less than 16,850,000 bushels, or, 2,106,250 quarters annually, which is far more than sufficient for seed to sow the ensuing crop. Indeed, it is according to my calculation on the produce of corn something more than one tenth part of the whole crop. I am not acquainted with the data upon which the worthy baronet has founded his estimate, but it is so enormously large, that one would fain hope there was some mistake in it, otherwise, if it be as correct as the nature of such calculations ought to be, and we add the quantity destroyed by birds, it will appear, that the produce of near, or full, 800,000 acres, is one year with the other consumed by vermin.

Mice do incredible mischief, as well in the mow as in the field.

Sparrows commit great devastation in an inclosed country. In some counties there is a custom for the churchwarden or overseer to employ boys to take their nests, paying so much per dozen for their eggs, or per head; which is paid out of the rates; were this practice to prevail generally, they would be kept under, and might in time be extirpated.

Rooks and crows are great destroyers of wheat when it is just coming up, as well as after a severe and long frost and snow, the melting of which by softening the ground, enables them to pluck up the roots with facility, and the voracity of their appetites is then so keen that nothing but guns will effectually keep them off. In February 1804 the destruction of a piece of lay wheat at a distance from a farmhouse, in the parish of Lingfield, was astonishingly great. I have myself lost a whole crop through the carelessness of the servant set to frighten these birds. The poet was certainly mistaken when he wrote thus :

Retiring from the Downs, where all day long  
They pick their *scanty* fare, a black'ning train  
Of loitering rooks, thick urge their weary flight,  
And seek the shelter of the grove. —————

It has been questioned whether these birds do or do not as much good as harm. Wherever the plough is at work, they follow it furrow after furrow, devouring worms, maggots, grubs, and the whole tribe of insects which secrete themselves in the earth.

Moles are very troublesome in pasture and meadow ground, in drains and ditches, and are not sufficiently attended to.

#### WHEELS.

By the 13th Geo. III. c. 78, s. 55, It is enacted that no waggon having the sole or bottom of the fellies of the wheels of the breadth of 9 inches, shall be drawn with more than 8 horses; or whose sole or bottom of the fellies of the wheels of the breadth of 6 inches, and rolling on each side a surface of 9 inches, shall be drawn with more than 7 horses; and no waggon rolling a surface of 6 inches only, with more than 6 horses. But carriages moving upon wheels or rollers of the breadth of 16 inches with flat surfaces, shall be allowed to be drawn with any number of horses or other cattle.

These restrictions were intended by the legislature as a preservation to the roads, but like every other wise and salutary measure which is not looked after, it is in every instance evaded, either by the cunning of the owner of the waggon, or by the contrivance of the wheelwright. Every stage waggon that sets out from London, whether it be a 9 inch, a 14 inch, or above 16 inch wheel, is shod with two or more tires or plates of iron in width; and these ought to be so placed, as to form a flat surface; instead of which, there is a middle tire or plate of iron made convex, about three or four inches wide, but not more, about  $\frac{3}{4}$  or an inch thick, somewhat thinner towards the edges, which

is placed between but over the two tires, which hides the joint; and it is upon this middle tire or plate that the waggon moves, instead of the whole surface of the wheel, which scarcely touches the ground, unless where the road is soft; it then cuts in as far as the broad surface, and the draught is increased; but the injury done to the road is not less than if a narrow wheeled waggon drawn by the same number of horses, and with nearly the same weight, had passed over the road.

The rolling waggons, as they are called, instead of benefiting the roads, do them irreparable injury; the fellies instead of being flat, form an inclined plane, perhaps of four inches, between the front and the hind part of the felly of the wheel; the middle tire which is placed on the felly is made so thick, that it forms nearly a level with the tire towards the hind part, leaving a cavity between: these wheels therefore, instead of forming a pressure of 16 or 18 inches, which they would do if the whole surface was level and even, move upon little better than four inches; upon all hard roads, the enormous weights which they carry, the weight and number of the heavy horses which draw them, cut up the roads beyond measure, for no materials are equal to the resistance. Soft roads are destroyed by them and made impassable, as is the case with all the north roads; and hard roads are sunk in holes, owing to the difference in the powers of the materials with which they are repaired.

Narrow wheels are subject to a heavier toll in proportion than the broad wheels, because with truth they are considered to be more injurious; but

if the owners of broad wheel waggons are to be permitted to avail themselves of this trick, the public are suffering a material injury thereby, and it ought to be put a stop to.

#### PISE WALLS.

In the appendix to the first volume of *Communications to the Board of Agriculture*, is a subject on Pise walls drawn up by Henry Holland, Esq. From the great skill and practical knowledge of that gentleman I was extremely anxious to see in what way the subject could be recommended to the public through the Board, I therefore read it with great attention, because I had had repeated opportunities of seeing it attempted to be executed.

Mr. Holland's communications profess to be extracts from the work of Mr. François Cointeraux, published at Paris, in the year 1791, containing an account of a method of building strong and durable houses, with no other materials than earth, which has been practised in the province of Lyons for ages, though little known in the rest of France, or in any other part of Europe.

The art, says the author, well deserves to be introduced into more general use. The cheapness of the materials which it requires, and the great saving of time and labour which it admits of, must recommend it in all places and on all occasions; but he says that it will be found particularly useful in hilly countries, where carriage is difficult, and sometimes impracticable; and for farm buildings, which, as they must be of considerable extent, are

usually very expensive without yielding any return.

Mr. Holland having first detailed the origin of *pisé*, which is of no consequence here, proceeds, 2dly, to give an account of the implements necessary for building in *pisé*, which are as follows: Besides the common tools, such as spades, trowels, baskets, watering pots, a plumb rule, a hatchet, hammer and nails, the only implements necessary for building in *pisé* are a mould and a rammer of which he gives a particular description.

3. The method of working.

4. Method of forming the openings for the doors and windows.

5. On the effects of beating or compressing earth, cement, or other compositions used in building.

6. On the description of compressed earth.

7. On the height of *pisé* walling that may be executed in one day.

8. On earth proper for building.

9. On the mixture of earths.

10. Experiments to ascertain the qualities of any earth.

11. On the preparation of the earth for building.

12. On the bond timbers to be used in buildings of *pisé*.

13. On building walls for inclosures.

14. On the time and labour necessary in building a certain quantity of *pisé*.

15. On the outside covering.

16. On painting in fresco on the outside covering.

From the particular manner in which Mr. Holland has introduced this stile of building to the notice of the public, one would at least suppose that he had thoroughly informed himself of the practicability of the measure, that he was satisfied it would answer, before he became an advocate for its general introduction. It is possible that all this may have taken place, and that may have induced him to recommend it to be used in the construction of the extensive new farming buildings at Oatland's, the seat of the Duke of York, during which time, having had some estates to value and to sell in that neighbourhood, it fell to my lot to be a frequent visitor there, and to mark the progress of the work in all its combinations.

It may be fair to suppose that as no expence was ever spared about any of the work carrying on at Oatland's under the direction of Mr. Holland, and as he was bringing to public notice a new mode of building which he had recently so strongly recommended, it is fair I say to conclude, that nothing which materials or labour could effect would be wanting or deficient. As I do know however, from an authority which cannot be disputed, that, that was really the case, how did it happen that so much of the work, that is, the Pisè walls tumbled down before they were finished, have repeatedly fallen down since, and have as often been set to rights, without being at all sound to this day, although tiles and other materials have been bedded therein to keep the work together without success, and which is contrary to the mode he has laid down in the third chapter of the communications before alluded to?

Indeed from every thing I have seen of it from time to time, and I went very recently to examine it, I am thoroughly persuaded that these walls never will stand the frost and the continued rains of our seasons without crumbling in pieces, and eventually giving way, which will be a source of endless expence, much greater, without being so sound, than if they had been built with brick and mortar.

I do not mean to condemn the practice in toto, because I am aware that there are soils perfectly adapted for such purposes, and where it may be used to advantage. But I am speaking of the buildings at Oatland's, and therefore I have a right to say, if the materials were bad, or not exactly calculated for the purpose, why advise his royal highness to use them? If it was his royal pleasure that Pisè walls should be constructed, it was the business of his architect, in a double capacity, to have procured others that were good? If the manner of preparing the earth was not properly understood by the workmen, why persist in going on with it after so many repeated warnings, or why not have tried others? and because, most certainly, Mr. Holland's credit as the architect and the promoter of these Pisè constructions, was deeply implicated in the consequences; and that being the case, nothing should have been left untried, even if the expence had come out of his own pocket, for to my certain knowledge, his failure at Oatland's has put an effectual stop to the introduction of Pisè walls throughout that part of the county.

It is somewhat unfortunate that the scheme was



not tried upon a small scale first, until the workmen had become handy, and the quality of the materials properly ascertained. The common mud walls in many parts of the county which this Pisè was meant to supersede, does not stand in many instances so badly as the Pisè, although built by ignorant clumsy workmen without proper tools: What must these people then think of Pisè constructed by the best artists, and with every requisite apparatus at hand?

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### CATTLE.

It will be most readily imagined that in a county bordering on the metropolis of a great empire, whose inhabitants have become the richest subjects perhaps on earth, through the medium of their unrivalled commerce; and who from motives of pride, luxury, or of health, seek an asylum within its pale; that such a country can hardly be supposed to have its peculiar breed of stock of any kind, we see this fact verified in all the countries bordering on it, if we except the sheep of Romney Marsh. Much less can it be supposed, that in such a county as Surrey, filled as it formerly was with wood, and of course with so little pasture, the inhabitants could bestow that peculiar attention either to neat cattle, to sheep, to horses, or to hogs; which alone would have enabled them to have shone in any one particular, and to have had that breed ascribed to the county. Again, the caprice which has accompanied these rich adventurers from time to time

as they have settled or resided in the county, has been the means of introducing almost every species of domestic animal, whether good, or bad, that the kingdom has afforded; by which means, mongrels of all descriptions are to be found, and have crept in among better breeds. To detail the varieties that have been kept would be an endless task and such as I would not attempt; but I may venture to state those which are provincially distinct, and which are to be found at this time in the country.

## COWS.

The breed of horned cattle most prevalent near the metropolis, on the Surrey side, is almost exclusively the short horned or Holderness, which are kept by the different cow-keepers, to supply the Borough of Southwark, that part of the city of London next to it, a part of the city of Westminster, and the intermediate districts which amount to as great a population. The total number of cows kept for that purpose at Lambeth, South Lambeth, Kennington Budge, the Wash Way, Cold Harbour, Peckham, Camberwell, and Newington, with a few in Bermondsey, amount to upwards of 600. As the treatment and produce of these cows have been so accurately detailed by Mr. Foot, in his report of Middlesex, it will not be necessary for me to enter upon that subject, especially as between Mr. Baird, and Mr. Middleton, they may be said to have milked the subject dry.

Besides this breed we have Jersey and Alderney, Suffolk polls, galloways, Welsh, Devonshire, and

Sussex cows dispersed over the country; a great deal of butter is brought to the different markets of Croydon, Kingston, Guildford, Farnham, Egham, Chertsey, Haslemere, Dorking, and Ewell, and some of it finds its way to London. The average price throughout the county for the last three years, has not exceeded 14*d.*; yet by the time it finds its way to the consumer in London, it fetches 18 and 20*d.* per pound, besides being there adulterated, or at least mixed with a certain portion of Dorset butter. Of the breeds above noted, at least the Jersey or Alderney produce by much the richest milk, and if kept in equal condition with any other cow, will yield as great if not a greater proportion of butter.

Some years ago I had an Alderney and a Suffolk cow, the latter was the best of the kind I ever saw, for which I gave upwards of 20 guineas; the Alderney I bought out of a drove of the same kind as it passed my door, starved, miserable, and with scarce a foot to stand on, had just dropped her first calf, and she cost me under seven pounds. I kept them both six or seven years, and being in their prime and well kept, the milk and butter always kept separate, it was proved year after year that the value of the produce of the Alderney exceeded that of the Suffolk, though the latter gave more than double the quantity of milk at each meal, and when I lost the former, which was drowned in a deep pond in the month of July, having calved down in the beginning of February preceding, it is a fact that she made 8lbs. of the best butter in the world the last week. At that time I had a dairy of

twelve cows; two Devons, one Derby, one Lincoln, two Sussex, two Wiltshire, long horned, two Holderness, one Suffolk, and one Alderney, and she bore the palm clear away.

The Devon and the true bred Sussex have each their partisans, and as breeders for stock, for the plough, and for the butcher, are superior I have no doubt to every other breed. It is supposed that the Devon is the original breed, of this we have no proof, and we may with just as much propriety say that the Sussex is the original breed, and the Devon the variety; they may be both distinct breeds, although assimilating in many distinguishing characteristics, because I think it will be difficult to establish the point that the Devon breed were in those early days, driven so far to stock the county of Sussex with, and we have not the least traces of any other native breed, and why Sussex should have been the only favoured county to have received this breed from Devon, when its sister Kent with the marshes, nearly as good as those of Sussex, had none of that breed, but own Sussex only as the true breed, I am at a loss to account for; however, I leave this point to be settled by the antiquaries of the respective counties.

The Devon breed, such as I have frequently seen in the neighbourhood of my Lord Fortescue's, near South Moulton, and about which country their prime stock is found, are fine in the bone, with a clean neck, fine in the chops, wide across the hips, body well barrelled save on the sides, where they are rather flat, and somewhat too high, but clean in the legs. The colour dark red, the skin thin,

soft, and delicate; they have a quick step, are very tractable and hardy, and their make peculiarly fits them for the yoke or the collar. They may be worked until they are six years old; they then fatten kindly, as indeed they would without, and come to a great size much sooner than most other breeds. We have had this year, 1804, and the last, a vast number brought to this fair as well heifers as oxen, and I have paid particular attention to their characteristic properties in company with a gentleman who has been before and then was a buyer. The objection which may be stated against them, and which I well remember to have been an observation of my old servant Aynscomb, is, that generally they are not calculated for the dairy in a country less rich and deep in feed than Devonshire; and he had daily evidence of this fact, as a neighbour of mine in Hertfordshire had a dairy of ten or twelve cows of that breed only, which were far from being so productive as a breed accustomed to get their living upon a short bite would have been. My Suffolk cow, for example, was a far superior animal for the dairy in that county.

The Sussex, such as we see about Lewes, is somewhat of a lighter colour; the hair on the hide sometimes curled, the head and neck clean, the horns wide, but not long, wide across the hips, straight back, sides too flat, the bone moderately small, and the legs short; the udder well proportioned, thin, but rather hairy; the milk abundant, but not very rich: from being shorter on the leg they feed faster than the Devon, are altogether a heavier animal, and their movements consequently

slower.\* Those which are met with about Rotherfield, are larger animals still, more coarse in the grain, and larger horned; they are patient in the yoke, very tractable, and go through a great deal of fatigue. Of the former kinds we have many in all that part of Surrey which borders on Sussex; they are held in great estimation. I am of opinion that were our Surrey farmers to make choice of the best of the Sussex and Devon stock, and to breed in and in as it is called, and selecting the prime therefrom, it would be possible to obtain a breed as perfect as the nature of such animals could be; and many of them think so, but have not the resolution to set about it.

The little galloways are kindly animals, their milk sweet and rich, and by some gentlemen are preferred to the Alderney; they are besides as hardy as the Welsh, and fatten favourably, laying their fat upon the most valuable parts; their colour is black or dark brindle; their hides are not so thick as the long horned Wiltshire or Lancashire, nor so thin as the Sussex; and the quality of the meat is so much valued in London, that I learn from Mr. Wheeler, who succeeded a very eminent Sussex salesman, the late Mr. John Ready, that in proportion to their weight they fetch more money than any other sort whatever.

\* Mr. Ellman, of Glynd, near Lewes, has an uncommon fine bull of this breed, which, although a rider, is calculated to weigh 170 stone.

**CALVES.**

The farmers in the neighbourhood of Guildford suckle a great deal, and a vast many calves are killed weekly in that town for the London markets. The stock kept for that purpose is of no particular breed that I could discover, every farmer seeming to suit his own fancy as to the sort, provided they are good milkers; nor did I observe any particular practice to be pursued different from that which is followed by sucklers of other counties.

I have heard much of the mode of suckling in Holland from a servant of mine, who formerly lived many years in the service of one of the first burgomasters, and whose farming concerns, (principally in the dairy for cheese and butter) which were very extensive, he managed. To the best of my recollection, (for the minutes I then took I can no where find,) the suckling houses were long and narrow, but tolerably lofty. The pen in which the calf was kept was so narrow that it could not turn round, so that its only motion for exercise was going backwards to the end of its pen (which was also short) and forwards to the door. The house was kept in total darkness, and the pen kept very clean and sweet. When the suckler came to administer the milk, a small hole was opened just big enough to admit its head out, made in the door way; as soon as the animal sees the light, it makes to it, puts out its head, which the suckler puts into the milk-pail, and being taught to drink the milk, it very soon gets fat, and much quicker than by

our mode, where the calf is either tied up, or has room to run about in an open place. A piece of chalk is hung up by the door for it to lick; when the calf is to be removed the pen is so contrived as to height, that when the door of the suckling-house is open it falls down on the tail of the cart, and the animal readily enough walks into it, where it is secured. The floor of the pen is of lattice work, so that it always lays dry.

## OXEN.

A great many are fatted in this county, at Bollingbroke-house, Battersea, which is now a capital distillery, and occupied by my old friend Mr. Hodgson and Co.; they have erected stalls for fattening about 350 head at one time with wash and grains, and a certain portion of hay per diem, with the view to enable them to chew the cud. They formerly stood and lay upon a framing of lattice work or trellis, which was raised a little above the pavement, and had neither straw nor haulm, but the bare boards for their bedding. This practice has however been entirely abandoned since it was reported in the former survey, because it was found that their feet were so much injured by the unevenness of the surface as to induce the proprietors to take it all up and pave the stalls with bricks.

Between October and April, which is their regular working season in the distillery, they fatten as near as may be 600, having generally about 305 in the house tied up at one time, and about 100 in an adjoining orchard to take in, to replace such as



are sold off; or in consequence of any expectation of an approaching advance in the price of meat. I do not find that they have any stated period for fattening these bullocks, as they are guided entirely by the markets, but from 10 to 16 weeks is about the usual time, and they are found to gain from three to four stone per week. Their food is wash, grains, and hay, sometimes meadow, at others clover, and relieved occasionally by oat or barley straw sometimes cut into chaff but not always. Hay or straw is given to them twice a day that they may chew the cud, and as much grains and wash as they can eat; in general they come readily to this feed, but some will take four or five days first.

The only objection I saw to the management of this stock was, that as the cattle lie without straw or litter of any kind, although the stalls are regularly swept clean, yet I perceive they are apt to get very dirty when they lie down; and it is not improbable but that this kind of feed may make them dung more than any other, and therefore it would be almost impossible to keep such a number perfectly clean without additional hands, which in course would increase the expence and lessen the profit; it must be evident however that the cattle cannot thrive so well.

The stock is of all sorts, sizes, and ages, there are many Scotch, Northumberland, Welsh, and Hereford, but neither Sussex nor Devon, which they say are too dear for them; and according to their quality are supposed to pay from 5s. to 20s. per head, per week.

At this place is the most complete horizontal mill

in the kingdom, it makes four revolutions in one minute with a moderate wind; each pair of stones will grind 21 quarters of malt in one hour. They have also a very complete steam engine, with which, and one bushel of coals, they can grind from three to four quarters of barley.

They make their spirits from malt and barley, sometimes they use rye, and but seldom wheat, because of late years it has been too dear, and they have now so simplified the process, that the proportion of the latter to the former is only as eight to seven.

Every 100 quarters of malt produces about 2000 gallons of spirits and 11,000 gallons of wash, which pays a duty of 16½*d.* per gallon during the working season, the duty and other expences of the distillery are computed at £1,100 per week. It was under the tuition of Mr. Hodgson that our right honourable premier, Mr. Pitt, became acquainted with the arts and mysteries of the distillery.

At the new distillery on the Middlesex side of the water, belonging to Messrs. Cook, Smith and Co. they have brewed 260 quarters per day, and their duty has amounted to the enormous sum of £6000 in one week, and for several succeeding weeks to very near that amount. They have not begun to tie up any cattle. But at Messrs. Smith and Harrington's, at Brentford, they have near 500 tied up, and kept in the highest possible stile; so fine a sight is no where in England to be met with; and these gentlemen take much pleasure in shewing them to persons properly introduced.

**F** At Messrs. Calvert, Clarke, Dunkin and Scott's distillery, (formerly Sir Jos. Mawbey's, at Vauxhall,) they are preparing their very extensive premises for the fattening of cattle as well as hogs; they have at this time about 100 tied up, which stand upon grating, are well littered down and regularly curried, so that their coats are sleek, and the animals look well and very thriving. The greater part are galloways, and almost all of them of the poled sort.

Mr. Wheeler, of Brixton Causeway, salesman, bred a very large black and white ox out of a Yorkshire cow and a Scotch bull; he was dropt on the 20th of March 1799, and is now, June 1805, computed to weigh 250 stone. He is fattening for the next Christmas shew, and it is supposed he will then be the largest ox that ever was seen.

William Coles, Esq., of Norbury Farm, fatts a large quantity of stock; his arrangements for this purpose are upon a very extensive scale. He confines himself to no particular breed, but buys such as he thinks most likely to pay him; however the larger proportion is of the Holderness breed. Their food is oil cakes and hay, of the former he has consumed this season about 30,000, and as his intention is to lay all his home ground down to grass, I have no doubt, when he has effected it, that he will fat more stock than any man in the county, with the exception of the distilleries.

Mr. Birkbeck fattened an ox of a small size upon parsnips and hay, and in 13 weeks it weighed upwards of 100 stone. It was killed by Mr. Sprately, of Guildford, and was greatly admired for the

beauty and quantity of its fat, and the fine quality of the grain of its flesh.

Mr. William Adam, of Mountnod, still continues to fatten stock, and if I may judge of the sort which are to be seen grazing in his fields by the road side, seems partial to the Galloway and Northern breeds; and if he, by sending daily to Vauxhall or Battersea for wash, a distance of at least four miles, can find it answer his purpose to fatten stock in the stall with wash, oil cake, and hay, I apprehend it will not be disputed but it must pay my friend Mr. Hodgson well, because he has at least one principal article within himself, which may be said to cost him nothing. Mr. Adam also works his oxen at plough, and in the cart, with traces.

Many of the gentlemen in the county, as well as farmers, work oxen—Mr. Currie, General Delancey, Mr. Sumner, Mr. Halsey, Mr. Birkbeck, Mr. Smallpeice, Mr. Drewet, and most of the farmers who reside towards the south east division of the county. Some work them in harness as General Delancey, who has four of these teams, but almost all the others work theirs in the bow.

The objection which appears to prevail most against their use is, that they are apt to do mischief in hot weather, when attacked by flies and other insects, but if they were worked early and late, and lay by in the heat of the day, I apprehend the danger would in a great degree be removed. But some people have run away with an idea or prejudice that the working of oxen injures the meat, making it hard especially about the shoulders and neck: it is no new prejudice, for I remember the same ob-

servations having been made even when I was a boy. But wishing to put the matter to the proof, I have frequently eaten of those parts which have been expressly cut for me by the butchers here, from oxen fatted in the neighbourhood, after having been worked three, or four, or more years, and I do not remember to have found it so; indeed the butchers confess they never heard of the idea before. I have also asked Mr. Elphick, and Mr. Wheeler, both of them eminent Sussex and Kent salesmen (and the latter was formerly an eminent butcher,) and both of them agree that it is not true. The idea must have been built upon a false hypothesis, and has probably originated with some salesmen of other counties, in order to cry down the value of Sussex meat at Smithfield, that they may the better sell their own. But admitting the prejudice to be well founded, it can only apply to the points of draught, the shoulders and that part of the neck that is in contact with them, and those are the parts among the least valuable of any about the ox. If the animal was slaughtered immediately as he came from work, after having been kept three, or four, or more years without intermission at constant hard labour, I think there can be no doubt but the flesh about the shoulders will be callous and hard; but put that ox up to fatten, and a revolution presently takes place, he thrives more kindly than one which has not been worked; fresh matter is generated and diffused in the nature of fat; it does not attach itself to one part of the body and leave all the rest without any, it does not fix itself to the ribs and leave the shoulders bare; the juices flow through the

veins there as well as every where else, and by consequence whatever tends to fatten other parts will do so by the shoulders, and I think it is hardly probable, that where there is any quantity of fat, the flesh beneath it can be hard, because it is the peculiar property of fat to make things soft, especially flesh. Be this as it may, our farmers are so well satisfied with the advantages arising from the proper and moderate working of oxen, both as to the quantity of valuable labour performed by them, and their better condition for fattening, that they smile at the idea as irrational and fantastic, while they do not fail to adopt the good old practice as they call it of working them.

Many oxen are fatted in the different parts of the county, some with turnips and hay, some with oil-cake and hay, and last year I believe more were finished off with corn than with cake; those that had barley had it scalded. My friend Mr. Smith has at this time twenty Welsh runts at cake and hay, in a yard well littered, in order to raise as large a body of manure as possible within himself for his hungry soil. Mr. Thomas Lucas, Mr. Saunders, Colonel Hylton Jolliffe, General Delancey, Mr. Sumner, and many other gentlemen are following this beneficial practice, with this exception, that theirs are all tied up. On the king's farm at Mortlake there were only three, though from the quantity of hay on the premises, and the conveniences for stall feeding, one might have expected at least 15, or more; they were not prime, nor such as I should have expected to have found there.

The conveniencies at General Delancey's are certainly superior to any I have met with in the county, have been contrived with as much attention to economy as utility, and little seems wanting to make them very complete; even with all his care, I am sensible they have been attended with a very heavy expence. He did me the honour to accompany me round his premises, and behaved otherwise with the politeness of a well bred man and a soldier. If health should attend his spirited endeavours, I have every reason to believe that he will not only greatly improve his farm and estate, but will set a model to all the gentlemen around him.

Cattle that have died with diseases or natural deaths are often sent to London, and sold to persons in the neighbourhood of Fleet-Market, for purposes too shocking to be mentioned, and I believe the custom prevails so much in some counties, (Hertfordshire, and I dare say many others) that no horned cattle die but find their way to London in some shape or other. When I lost my Alderney cow I was offered an astonishing price for her by one of those persons who buy them, and I was blamed by my brother farmers for having so many qualms of conscience about me in not selling it. This practice ought, if possible, to be put a stop to, because it militates against the health of the people, and against the intentions of the legislature; and a cow-keeper was not many years since fined £20 for selling a distempered cow; and two men were fined £10 each for buying the same, and were committed to the Poultry Compter until they had paid it.







**HORSES.**

I scarcely know what to say upon this subject, we have no provincial breed, and such as are used for the purposes of agriculture by the gentlemen or farmers are generally of a heavy black kind, which the dealers from the North bring to our fairs, particularly Croydon, Ewell, and Kingston.

The practice of our farmers (as I think it is almost every where else) is to buy at these fairs two yearlings, to work them occasionally, and to sell them off in high condition at five or six years old.

**SHEEP.**

We shall find the following breeds scattered over the county. Dorsets for early lambing and sucklers, Somerset or the Mendip, which are a heavier sheep of the same shape and make, lamb early, and make larger mutton in nearly the same time. Mr. Saunders, and the farmers round that quarter which borders on Kent, are very partial to them, preferring them to the Dorsets on that account. Wiltshire wethers, for turniping and the fold. South Down, for stock and the fold, and are every where the favourite breed. A few Berkshire for the butcher in the rich meadows of Tanridge and Lingfield. About the commons many Welsh, and a mongrel breed between Welsh and South Down.

Mr. Saunders has a cross between the South Down and Somerset, which he likes very much as they come to a greater size per quarter, weighing

from 24lb. to 28lb., are equally gentle, fat kindly, but the wool is not so good as the pure Down, but yields from 3lb. to 3½lb. to the fleece.

Mr. Smith of Wilderwick has a flock of 200 Romney wethers which are a very good breed; I have had the pleasure of partaking of some haunches of this breed at his table, fattened upon hay and oil cake, which were truly delicious, partaking much of the delicacy of the Down with the fatness and gravy of the best Leicester. He keeps them for the fold in consuming his turnips, his rape, his rye, and his tares, where they respectively grow; and upon his pasture when he gives oil cake and hay.

Mr. Birkbeck has some of the Duke of Bedford's improved South Down, which are very promising. We have neither Norfolk, Leicester, nor Ryland in the county, that I have any where observed.

At Oatlands, the seat of his Royal Highness the Duke of York, is a flock of the celebrated Merino sheep of Spain, the property of his Majesty. From the small specimens I have seen at other places of this breed, and from certain prejudices in the proprietors, I was led to entertain a most unfavourable opinion of them; but upon more mature reflection on the subject, since I saw the celebrated stock at Rambouillet, belonging to the National Institute of France, and which consisted of the pure Merino and the several crosses therewith; I saw the impropriety of adopting too hastily the opinions of other people. The admission of the possessors of this breed that the quality of the wool is far superior to that of any other breed now in England, is unqua-

lified; but say some of them, "the animal is  
 " more delicate and tender, more susceptible of the  
 " diseases incident to sheep, particularly the foot-  
 " rot, and consequently unfit for a climate so cold,  
 " humid, and variable as ours; it is therefore only  
 " fit for the most dry, sheltered and warm parts of  
 " this kingdom (if it be fit or calculated for any.)  
 " Its shape and make too impress one with an idea  
 " of a disposition not to fatten seasonably, nor to  
 " come to size and weight even on the best pastures,  
 " or on the best artificial feed. It therefore never  
 " can be introduced with profit into the kingdom  
 " as a general stock." Let us, however, look a little  
 farther into the case, for unless we see both sides of  
 the question we cannot judge fairly, it would only  
 be *exiparte*. The mere dictum of any man, however  
 apparently unprejudiced, or speciously enforced,  
 should be received, in a question of such magnitude  
 as the rejection or introduction of any particular  
 stock, with extreme caution.

The Merino, like every other breed, has its various  
 qualities, it has its good, its bad, and its indifferent,  
 and before we condemn it in toto, ought we not to  
 be sure that our stock is of the very prime, without  
 which can we, or have we any just or reasonable  
 ground to expect that our success shall be com-  
 plete? What were not the prejudices a few years  
 since against the South Down sheep in every part  
 of the kingdom? particularly in Norfolk, in Lei-  
 cester, in Wilts, Gloucester, and Dorset, until that  
 enlightened and benevolent statesman Mr. Coke  
 carried them into the East, the late and much la-  
 mented Duke of Bedford, into the North, and my

old and respected friend Mr. Mighell (formerly of Hamsey place near Lewes) took them into the West. Now they have established themselves in every corner of the kingdom, and great improvements have been made to remedy any defective points about them by their respective breeders. Is there any breed of short woolled sheep so generally and universally approved as they are? And how were these improvements effected? but by the great skill and unremitting diligence of Mr. Ellman of Glynd, and other eminent flock masters, not by crossing with other breeds, but by a judicious selection of the most pure in make, shape, and wool, and by breeding in and in until they had obtained that degree of perfection in each requisite which was the object of their most earnest endeavours. And having once effected this point, they were as cautious in not contaminating the blood as the best breeder of horses on the turf could be. How were the celebrated Dishley breed obtained, but by the penetrating eye, the unceasing application, and the surprising efforts of that eminent grazier the late Mr. Bakewell? who it must be admitted brought that breed in point of bone, make, and shape, with a strong propensity to fatten, to as great perfection as a long woolled sheep was perhaps capable of being brought; but he was obliged to have resort to the pure Ryland for his cross. It has been since asserted however, whether in consequence of the fluctuating price of mutton, and the continued increasing price of wool, that the value of the fleece has been so lessened, as to induce many

of the advocates of this improved breed to resort to the old Leicester stock.

If those prejudices which so strongly prevailed against the introduction of the South Down breed have been got the better of by the most powerful of all arguments, namely, a full conviction and proof of their superiority; what is the reason, I would fain ask, and where is the impossibility that the Merino shall not prove with like care a most valuable flock in this country? Have we not seen at my Lord Somerville's last shew of cattle, specimens of two years old wethers dead and alive, as fat and as well shaped as could be desired, fed upon grass and fattened on turnips, and this too without deteriorating the quality or value of the wool? And as a proof that the latter was actually the case, I waited on Mr. Oakley, a very eminent woolstapler in Bermondsey-street in the Borough, who had the fleece from his Lordship, and he assured me, that he had shewn it to several of the most eminent men in that profession, challenging them to find fault with the quality, which not one could do, on the contrary they admitted it to be superior to any they had ever seen. His own opinion of it was confirmed by them, that it was fit to make the finest Norwich shawls and bombazeens with. If therefore it can be established and proved by the most incontrovertible evidence, namely the evidence of our senses, that the aptitude of this breed to fatten at an early age, and come to a good size, weight for weight, with such feed as is used to fatten other sheep; that in the richness of flavour and quality of grain it has no superior; that in the propensity

to fatten in any soil or situation as some other good breeds will, no deterioration of the wool takes place; and that it is not more subject to the foot rot (which is actually proved to be the fact) or any other disease than is common with any other breed under similar circumstances; if we can establish these points, what more remains to be done? In the case before-mentioned, viz. my Lord Somerville's, we see some of these facts, at least, abundantly verified and confirmed; for his lordship exhibited the carcasses of five fat wethers of the Merino and South Down breeds, half blood, four toothed, which had 23 pounds of loose fat each, which had been brought 160 miles from his lordship's farm in Somersetshire, where they were bred and fed. These carcasses were exceedingly fat and fine, and his lordship's friends partook of them at the dinner given by him at Freemason's Tavern in 1805.

In addition to these, George Tollet, Esq. of Twinings, near Tewkesbury, Gloucestershire, exhibited the carcasses of two three years old wether sheep, one Merino and South Down, and the other of the Merino and Ryland cross; the former had 19½ pounds of loose fat, and the other 23 pounds, (the same as Lord Somerville's half bred Merino and South Down,) these were brought 130 miles, and were got by a Merino ram belonging to the noble lord before-mentioned.

Mr. Birkbeck, of Warnborough, near Guildford, has at this time a lot of two tooth half bred tags (Merino and South Down) in number 65, which have been hard kept all the winter, and are now, May 1805, at fold on clover and ray grass,

and from their make and shape, promise to rival any South Down in the most fattening points, while the wool is so much superior; indeed he has no doubt of their weighing 20 pounds per quarter, at least, and to fatten upon this feed as fast as any other sheep.

Satisfied with this evidence, therefore, and of the vast importance which a fine stapled wool is to this country, he determined upon giving the Merino sheep a fair trial. He therefore ramed all his flock of South Down ewes, to the number of 600, with thorough bred and half bred Merino rams.\*

\* Before I had the pleasure of seeing Mr. Birkbeck's flock, I had called upon Mr. Drewett, of Send, who informed me what Mr. Birkbeck had been doing with his ewe flock; he very much approved his plan, and thought it was likely to be attended with every possible success. The day after I left Mr. Birkbeck, I called upon Mr. Smallpeice, and mentioned to him this bold attempt of Mr. Birkbeck; he however did not approve of it, and was so far convinced that it would not succeed, that he declared it to be his opinion that he had spoiled his flock, and would have great cause to repent it. I mention the opinions of these two intelligent men, because it shews how very differently the same prospects are viewed by those who will not give themselves the trouble of examining into consequences.

Nor is Mr. Smallpeice at all singular in this opinion; for in the communications to the Board of Agriculture, (page 187,) Mr. T. A. Knight, of Elton, near Ludlow; a gentleman celebrated for his philosophical and agricultural knowledge, says, "some crosses have lately been made with the Spanish rams, but the produce I have seen are ugly, (as they must be, if like the Spanish,) and are I am informed subject to the foot-rot."

As Mr. Knight has expressed an opinion so extremely unqualified; it becomes a natural question to ask him, whether the produce which he has seen were of the pure Merino stock of the first quality, or of an inferior race? or whether they were of the half or more distant blood? without which knowledge it is impossible



Those whose lambs were dropt early, I did not see, but both Mr. Birkbeck and his shepherd assured me, that the progeny were not only extremely promising as to their shape, but of fine quality as to their wool, so far as could be then judged. Those which dropt last I did see, they were shaped more like the Down than any thing I had ever seen, being broad across the loin, consequently likely to come to good weight in the leg, the bone fine, their complexion and appearance indicating perfect health, while the wool was very fine for that age.

Mr. Birkbeck has 12 rams of this breed, whose fleeces were lately shorn, from one of which I took promiscuously a sample of the wool; and upon thorough examination, it has been reported by every judge, either wool-stapler, or flock-master, to be nearly equal to the best imported Spanish

to judge of the propriety of Mr. Knight's remark; but as far as we may be allowed to conjecture, it would seem as if those which he had seen were of an inferior race, and he had therefore taken it for granted that as a Spanish production they must be ugly, and subject to the foot-rot. An idea so extremely erroneous and preposterous, that I am sure both his, as well as Mr. Smallpeice's better acquaintance with the prime stock cannot fail of removing.

Besides, if we look at Mr. Birkbeck's general principles, we shall see that he is among the last men that would undertake a speculative thing where the chance, such as is described by these two gentlemen, is so much against him. To a very comprehensive mind, enlarged by extensive reading, and a thorough intercourse with mankind, he unites a steadiness of character with no small share of mental as well as bodily exertion. Such a man therefore is not likely to plunge into an excess of speculation without mature consideration, and without a moral certainty of success. I admire his exertions, and he has my most hearty wishes for the fullest accomplishment of his purpose.

wool; while the quantity of wool obtained from each fleece averaged 7½ lb. in the yolk or grease, which when washed and scoured, taking the age and condition of the sheep into view, would I have no doubt produce 3½ lb. of wool, (which quantity wethers have repeatedly produced,) worth six shillings per pound; (which is full ninepence under the prime wools) the fleece alone will be worth near or quite 21s.; if to this we add the value of the carcase, which I lay at only nine stone, a weight which, on the authority of Mr. Birkbeck, there is no more difficulty in making the wethers attain, than there is with a pure South Down, this at 4s. the stone, by the carcase, will make the total value of the sheep, full £2. 17s.; but the carcase is worth more per pound than any sheep that comes to market, by one penny at least. Is this no argument in favour of these sheep? will the best South Down, Ryland, Dishley, Norfolk, or Romney, fetch as much per sheep, of the same age, and fatted upon the same quantity and quality of feed? If the adversaries to this breed cannot prove the affirmative to this question, there is an end to the controversy, and the superiority of the Merino stock becomes unquestionable and unrivalled.

I have before said that a flock of pure Merinos, the property of his Majesty, was sometime at Oatland's. I called upon Mr. Dixon, his royal highness's steward, a gentleman of unquestionable veracity, considerable experience, and, what is of no small consequence in determining any controverted point, free from those prejudices which an attachment to a provincial breed might engender; and he

assured me, that when these sheep were first put under his care, they were more or less diseased, as they were more or less in condition; that is, they were extremely low in flesh, which, with the humidity of the grounds and places where they had been kept, was in my humble opinion, in itself, sufficient to induce a variety of diseases. In proportion, however, as they were put to better keep, they improved in flesh, and the several diseases left them; and they went from Oatlands Park considerably advanced in bulk, renovated in their constitutions, and their wool, in quantity and quality, the admiration of every body. He is persuaded, that no native sheep whatever, under the circumstances which these sheep were in when they first came to him, could have improved faster under the same treatment which they experienced; he is convinced also, that a few years will make this stock as hardy as any other; that by proper selection, and due regard being had to their being kept in good and improving condition (which is of as much importance to a sheep as to a race horse) in less than seven years, such an alteration may be made in this stock, and their several crosses, as to set all competition on the part of short woolled sheep at a very great distance.

But when we talk of these sheep being more tender and subject to diseases, and of less value in the carcase than other sheep, let us meet the question fairly, and I challenge even my friend Mr. Ellman, Mr. Fowler, Mr. Culley, or any other great and celebrated breeder, to controvert me. It is admitted that the Merino sheep are natives of a country

hotter by several degrees than ours; and that to naturalize them to every soil and situation, it may take some few years; but even under these disadvantages, if we were to take a given number of the best ewes and rams, from each of these breeds, and place them on the mountains in Wales, in situations and climate exactly similar, and where the breeds could not intermix, and leave them to themselves for a certain number of years, I have no doubt they would find a most essential alteration for the worse in the course of that time, as well in carcase as in the fleece of all of them: and that upon a fair comparative value of them, I should not be afraid of meeting them upon this value, because I am persuaded, that the fineness and closeness of the wool of these sheep, would always keep them in that degree of temperament as would overcome the effects of cold, while the size of the animal would not be a bar to its procuring as much food as any other short woolled sheep, and would give it a decided advantage over the heavy and long woolled sort. Then I say, as to the carcase, give me the same time (though less will satisfy me) that has been taken to make any other breed what they now are, and see if I do not rival you even in that point, without lessening the quality and quantity of the wool; provided at least that it be a breed of the short woolled sort.

It is not necessary that what I have hitherto said of the hardiness of the Merino sheep, should be taken for granted on my bare assertion, I will endeavour to establish and confirm it on a most undeniable foundation.

On the authority of Frederick Molling, Esq. of Lawrence Pountney-lane, London, one of the most eminent Hamburgh merchants on the Royal Exchange, I have been assured that he has been in the habit of importing this wool by the way of Hamburgh, from Saxony, and other parts of Germany, in very large quantities for several years; and that it is generally as good, and sells as well, as the usual course of Spanish Merino wool does, that is imported direct from Spain. In full confirmation of this fact, the following extracts from a letter from Mr. John Henry Fink, of Cositz, in Upper Saxony, member of the economical societies of Zell, Cassell, and St. Petersburg, to Sir John Sinclair, Bart. and copied from the first volume of the communications to the Board of Agriculture, 1797, will clearly shew:

“ In the year 1765, the Elector of Saxony, Augustus Frederick, procured 100 rams and 200 ewes from Spain. In the year 1778, the same prince imported into his territories 300 ewes and 100 rams from other countries.

“ The Spanish sheep have, ever since their arrival in Saxony, formed a particular flock, distinguishing itself from every other; first, by a remarkably good state of health, for though they were accustomed to live at all seasons in the open air, and to feed on green pastures, as the flocks in Spain whence they were brought constantly do, yet they have perfectly preserved their former strength and health, notwithstanding the great change that has taken place in their food and the climate. For in Saxony there is no possibility of procuring any sort

of grass from the beginning of December till the beginning of April; nor does the roughness of the winter, which here prevails in those months, allow any species of stock to remain in the fields; a circumstance which rendered it necessary not only to shut up in stables these Spanish sheep, though accustomed to wander about at home, but also to make them live, instead of green food, on hay and straw.\*

However this breed not only remained perfectly healthy, but has constantly preserved, in spite of its change of climate, that goodness and fineness of wool which has always been admired in its parents. The common German sheep, on the whole, are neither so healthy as those from Spain, nor does the fineness of their wool remain so constant as that of the Spanish breed. The cause of this phenomenon shall be afterwards explained. To return,

“The Spanish breed in Saxony, which is kept separate from all other breeds, and preserved unmixed, has further distinguished itself. Some of its rams having been put to Saxon ewes, the wool of the Saxon flocks has improved to such a degree as not to yield, in point of fineness, to the best sort of Spanish wool.

“I have made this experiment, and have, by the use of Spanish rams, perfectly succeeded in converting the coarse wool of my sheep into fine wool, as may be sufficiently demonstrated by the samples of my wool which accompany these observations.

\* This must be admitted to be a very great change indeed.

"If it should be asked, by what means I have raised the wool of the first pattern to such a degree of fineness as is found in the wool of the second pattern; I can give no other answer, but that during 15 years I had made it a rule to cross the ewes of my original breed with no other than Spanish rams; and it is nothing but the constancy I have observed in following that rule, which rendered my wool so fine, and perfectly equal in value to that of the Spanish ram I had used.

"I am fully convinced that my improved wool will never change from better to worse, as long as no blunders are committed on the part of the breeder; that is, as long as I shall take care never to cross a ewe with a ram, the wool of which is inferior in fineness to that of the ewe. In the last case the intended improvement would be retrograde, and the wool would become worse.

"It appears to me that the size and bigness of sheep depend in a great measure, if not totally, on the quantity and quality of their food; for it is known from experience, that large and small kinds of sheep have, in their subsequent generations, either increased or decreased in size, when the pastures on which they fed produced either poor and scanty, or plentiful and nutritive food.\*

"The large kind of sheep, particularly the Holstein breed, want long and plentiful grass, and ling or heath; but such food is not always to be got in Saxony; for here, the sheep must, during the first part of the summer, feed in pastures which have

\* Nothing can be more true.

been eaten off by other cattle, and which, therefore, produce but a poor and scanty subsistence. When, therefore, the large sheep have pastured together with the small breed on the same ground, and on grass of the above description, they have generally fallen off much in flesh and bone; their lungs and liver have begun to ulcerate, and thus many of them have perished, because their food had been too precarious, and not suitable to their constitution. On the contrary, had the very same sheep suffered no want of food, and been well kept during summer and winter, either in stables or out of doors, they would have perfectly preserved their health and strength.

“ But as the large breed did not repay the trouble which was necessary to keep them well, the farmers and breeders of sheep have resolved to give up the rearing of the large kind, finding that the smaller sort answers their expectations better.

“ And as a proof how far large sheep will degenerate, let any one try and put a flock, or even a few sheep, formerly well fed and well kept, into a barren and sandy heath offering nothing but ling or heath, and he will find that the sheep will decrease in size each generation.

“ The mutton of a meagre sheep is dry, and does not recommend itself by flavour; but that of a sheep well fatted is so juicy and delicate, that if not equal, it is at least not much inferior to venison.

“ The flavour of the mutton is less affected by the kind of food on which the sheep had lived, than is commonly imagined.



When a sheep or wether has attained to the highest degree of fatness, the weight of its tallow or fat amounts to one-eighth of the weight of its flesh. In a middle degree of fatness, the weight of its tallow or fat amounts to one-twelfth of the weight of its flesh. But in a meagre state, its tallow is to its flesh as one to twenty-four.

The common native breed and the mixed Spanish breed usually drop one lamb at a time. The Spanish lambs, as soon as they are born, have a sort of wool which is very short and curled; the lambs of other breeds are usually born with long wool of a common degree of fineness.

In the improvement of the wool I have usually observed the following order, so as to render it equal to the best Spanish wool in point of fineness.

But not only coarse wool may be changed into fine wool; it is also possible to reduce fine short and curled wool, into coarse, long, and loose wool.

The quality of wool seems to depend upon descent, and the quantity of it upon food. Hence a sheep, when fed during the year with so sparing a hand, as just to be able to support its life, brings only half the weight of wool, which the very same sheep would have produced, if its food had been more plentiful.

The most advantageous mode which I know of, for improving the wool to a desired degree of fineness, is to put such rams to the ewes as possess that fineness of wool which we wish to transfer to our flocks.

"The more perfect the rams are which we have procured for our flocks, the more quickly will that improvement go on. Nature does not always accommodate herself to the rapid progress which our expectations of her liberality often anticipate; yet it has been confirmed by experience, that she seldom departs from the following proportions:

"Suppose the ram, whose fineness of wool we wish to incorporate with our flocks, to be designated by the figure 1, and the ewe which we unite to the ram, to be denoted by the sign 0. Now, as the sire is equally necessary with the dam to produce a lamb, it follows that the lamb will participate of one half of the qualities of the sire, and one half of the qualities of the dam; the lamb will consequently be related to its sire as  $1 \div 2 = \frac{1}{2}$ ; that is to say, it will share in one half of the qualities of the sire.

"Further, in the second generation let the ram remain 1, and the lamb produced from the first generation let remain in its qualities half; it follows, that the lamb produced from  $1 \div \frac{1}{2}$ , shall be equal to three-fourths of the qualities of the sire.

"Let the ram for the third generation be again 1, and the ewe to be crossed by it remain three-fourths, and the offspring of this couple shall possess seven-eighths of the qualities of its sire.

"Finally, let the ram for the fourth generation be 1, and the ewe to be put to the ram be seven-eighths it follows, that the lamb from the fourth generation shall partake fifteen-sixteenths of the qualities of its sire, and almost equal him. It may be easily perceived, that shepherds, by following

these rules, which depend on the unalterable laws of nature, may approximate their wool to that fineness which they would have it attain. Nature, it is true, advances sometimes forward, or goes backward contrary to our expectation, yet on the whole she remains faithful to her proceedings. The following rules may, in general, be relied on with safety :

1. " He that would improve the fineness of his wool, must endeavour to get as fine rams as possible, more especially for the first generation, for it is evident from what has been above stated, that if the first ram is not so valuable as the second, the improvement must of course advance more slowly.

2. " That the wool improves in fineness in the same proportion as the wool is finer which the ewe of the first generation possesses.

3. " That care ought to be taken not to admit a ram for the subsequent generations whose wool is not equally fine with the first ram. If that should happen, every one must see, that by such an accident, the progress towards refinement must either be stopped, or at least greatly retarded.

4. " In case the breeder does not wish that his wool should possess the highest degree of fineness, but only one-half or three-fourths of it, he can easily accomplish his desire. For he need only take a ram from the first generation, one-half, and a ewe from the same generation, one-half; or a ram from the second generation, three-fourths, and a ewe from the same generation, three-fourths; and the improvement of the fleece shall stop, so that there will be no change either from better to worse, or from worse to better.

5. " But if the breeder is not attentive enough to this particular, and puts a ewe which was used for the first generation, or a ewe with the same coarseness of wool with her, to a ram from the first generation, and consequently puts 0 to  $\frac{1}{4}$ , it naturally may be inferred, that the lamb produced by this couple, shall have only one-fourth of the fineness of his sire's wool.

" If a shepherd puts a ram from this generation =  $\frac{1}{4}$  to a ewe = 0, the lamb will inherit of its original sire's qualities no more than one-eighth. In such a case, the line drawn between the sorts to which the ram and the ewe belong, becomes gradually more prominent, and the two breeds which were intended to melt together in their properties, begin to separate and to return to their former state. And when this happens, it is not uncommon to hear the unexperienced multitude talk in the following manner: 'it is impossible to improve our wool—we have done and tried all we could. At the first sight it seemed as if it would answer, but we now find by experience that it will not succeed. Our wool at first improved, but not for any length of time; it soon returned to its former coarseness. Our pastures are so bad that they cannot answer the purpose. They are too hard, too weak, too sour, and too sweet, and so forth. We have not hay enough, its quality is execrable, and how can straw produce fine wool? It is in vain to talk from books. The learned may keep their Latin husbandry to themselves; we know the thing better from experience. Juicy clover, nutritive grass, either on plains or hills, and attention to the

proper mode of treating this species of domestic animal, will improve more effectually the fineness of the wool, than all the book learning in the universe.\*

" But however important this practical wisdom may appear, nothing is more certain than, that no sort of wool can be improved, without the methods above mentioned, and that no regular progress in improvement is practicable, without applying those methods with as much accuracy and constancy as possible.

" Food has no manner of influence on the quality or fineness of wool. The quality which we discover in the wool of one flock is an essential and distinguishing mark of it from other flocks. It remains unalterable in all subsequent generations, provided no faults are committed on the part of the breeder, which have a tendency to render it worse. The quantity of wool depends entirely upon the quantity and nature of food.

" If a flock be allowed to suffer hunger, a natural consequence will be, the wool stops in growth,

\* Dr. C. Hillier Parry's, of Bath, Account of the Progress in Rate of Amelioration of Wool by the Spanish Cross, is as follows :

The first cross of a new breed gives to the lamb half of the ram's blood, or 50 per cent.; the second, 75 ditto; the third 87 ditto; and the fourth, 93½; at which period it is said, that if the ewes have been judiciously selected, the difference of wool between the original stock and the mixed breed is scarcely to be discerned by the most able practitioners.

it loses its softness, melts as it were together in clusters, and becomes less useful.

Let any one clip off the bad wool, then feed the animal plentifully, and it will produce more useful wool, which has natural elasticity.

A breeder who would give his wool only a certain and fixed degree of fineness, such as one half, or three fourths, or seven eights in the fineness of the ram, may, if he like it, turn fine wool into more coarse, by putting a ram of one half to a ewe of one half, or a ram of three fourths to a ewe of three fourths, or a ram of seven eights to a ewe of seven eights.

Sometimes nature, as I have observed, seems to diverge from her usual course, and the fleece turns out to be either a little finer or coarser than was expected, but this she does only occasionally, and it is far from being general. A new born lamb displays no marks of the fineness to which its fleece shall attain in process of time, and no less than a whole year must have passed before it is possible to decide that point with any degree of certainty.

Some have a rule to breed no more lambs for rams than are absolutely necessary to propagate their flocks. But this custom has a tendency, I will not say to retard improvement, but to make it retrograde; for if there are no more rams reared than are absolutely necessary, it will often happen, that among those rams there are some whose wool is of a lower degree of fineness than was expected. If this take place even in regard to one, the consequences may easily be foreseen.

Those, therefore, who would wish to avoid

such disappointments, will bring up twice or thrice as many ram lambs for their flocks as are absolutely necessary; for, by so doing, he procures himself the liberty of selecting such as will answer best his purpose. And as this double or treble number of rams are to be kept only till they are one year old, he may, after the selection, get the rest castrated. If this remark be duly attended to, there is as little probability that the wool of the flocks of Germany, or more northern provinces, should degenerate from the excellence of the quality, than there is room for believing that the flocks of Spain shall cease to propagate the qualities of their fleece. Indeed, were the Spanish breeders themselves to cease selecting for their ewes the most proper rams, or even to neglect to do so with their usual care and accuracy, nothing can be more certain than that those famous flocks would soon sink into contempt.\*

“ In Spain but few lambs of the fine wandering herds are castrated; and these are called tame lambs, because they answer the voice of the shepherd, by coming when they are called, and for this reason they are used to lead the flocks. All other male lambs remain rams, and hence it is easy for the breeder to select such of them as are apt [likely] to propagate the same fineness of wool, and to preserve its fame.

\* Does not the whole of this passage justify Mr. Birkbeck, or Mr. any body else, in the pursuit, with the view to the amelioration of the fleece? The carcass will follow as a necessary consequence.

" The weight of wool has been found to keep pace with the quantity and quality of the food. A sheep which has got no more, and no better food than was indispensably necessary to preserve its life, produces only two pounds of wool in a year; but give the very same sheep, in the succeeding year, plenty of good food, so that it fattens, and the weight of its wool will increase to four pounds.

If we consider only those sheep which are neither quite fat, nor quite meagre, but in a state between those extremes, the produce of wool in Germany, on an average, may be estimated in the following manner:

" A suckling ewe of the mixed Spanish and Saxon breed, with a long tail, commonly gives in a year of wool about  $2\frac{1}{4}$  lbs. A ram of the same breed and description 4 lbs.

" A large suckling ewe of the Holstein breed, in the marshes, with a short tail, 4 lbs. A ram of the same kind 7 lbs.

" A suckling ewe of the Little Heyde, Schmucken,  $1\frac{1}{4}$  lb. to  $1\frac{1}{2}$  lb. A ram of the same race 2 lb.

" To preserve the health of flocks, it is, I think, more advisable to clip them only once a year, and that in the middle of the summer. The weather in autumn is very unsettled, at one time very cold, at another very warm; and to strip the sheep in this season of their wool is to deprive them of the comfortable garments which nature gave them as a covering against the inclemency of the weather. Besides, these animals, when their naked skin is exposed to the cold rain, commonly lose their appetite for food, shrink into a melancholy posture, and endea-



your to creep into holes, either under trees, or in buildings, and very evidently decrease in flesh. However it must be allowed, that by clipping a sheep twice a year, the first at the end of April, or the beginning of May, and the second time at the end of August, or the beginning of September, one tenth more wool is gained, than by clipping it only once. The reason appears to be, because the wool never grows more quickly than at the time it has been shorn.

“ A sheep clipped once in two years will certainly give one third less wool, than if it had been clipped four times in two years; and a sheep shorn once in three years, will furnish but half the wool it would have given if it had been clipped six times in three years.

“ The longer the wool, the less quickly it grows, till at last when it has attained the length appointed by nature, it entirely stops, and does not grow any longer.

“ In Baron Schulz of Sweden's Report to the Board of Agriculture, it appears that in the year 1723, Sir Jonas Alströmer (counsellor of commerce, and knight of the order of Vasa) imported into that country some Spanish, and a few years before some fine woolled English sheep. In the year 1764 there appears to have been no fewer than 88,750 genuine fine woolled sheep, without counting 23,384 good sheep of mixed breeds. If perfect credit can be given to the first of these numbers, it would give room to conjecture that in the above year there was in the country a stock of 266,259 *lbs.* of fine wool. The annual fleece of each Spanish

sheep may reasonably be reckoned at three pounds, without adding to it the wool of the belly and legs, which however the manufacturers are accustomed to let pass at the same price with the rest, when it is found to be well washed.

Of the several Swedish farms which supply the manufacturer of that country with premium wool (that is of the finest quality) of the Spanish kind, there are two that belong to the baron. At one of these, a race of Spanish sheep, of near 50 years standing, is kept; he has at six different times brought from Spain both rams and ewes, with a view, if possible, further to ameliorate the Spanish breed of sheep already on the spot. He had also of late years an excellent opportunity, by means of a friend and relation resident in that country: but as a proof that even in the Spanish provinces, noted for the breed of sheep, real fine woolled sheep are not so common, I must mention that of six different cargoes, consisting of Leonese and old Castile sheep, procured with great pains, not more than a single one which arrived here in the year 1778 surpassed the former race. All the others were far below comparison with them; on which account also, the appraisers at the public hall strongly dissuaded all mixture of the four latter parcels of Spanish rams and ewes with my former stock. What value is put in Spain itself on a choice ram, appears by this, that for such a one, according to Baron Clas. Alströmer's ocular evidence, a curious sheep farmer in the country will pay as high as 100 Spanish Ducats.

The capital sort, which arrived in 1778, was

of the Leonese stock, which the Baron thinks has the preference over the much renowned Castilian race, from Segovia, Soria, and Burgos.

“ The oldest and finest Spanish race was most probably Syrian, which breed of sheep both in former times and now are known to be fine woolled; but if it is true, according to the assertion of others, that all Spanish sheep originate from Africa, it is at the same time likely, that they have been in part altered for the better under the climate of Spain, which has been further tempered by their yearly removal to a mountainous province, and to one six or seven degrees more northerly during the greatest heat of the summer.”

Let us next examine those in France, and I cannot do it better than by transcribing from a Report (most obligingly presented to me by Messieurs Teissier and Huzard, at the Agricultural Meeting of the National Institute at Paris, on the 8th of September, 1802, which I was invited to attend by those gentlemen) such parts as may tend to prove the value of these sheep, and the interest they take in multiplying and disseminating the breed.

From that report it appears, that the fine wool of the Merino breed at the national farm at Rambouillet, in the course of five years doubled its former price, which is solely attributed by the reporters to the general increasing value of the wool, rather than to any eagerness on the part of the buyers, who, on the contrary, were known to have coalesced for the purpose of buying it at an inferior or low price. In spite of their efforts, the price of

the wool of this improved breed, kept pace with that of the finest fleeces obtained from the pure Spanish sheep; and it was desirable to the buyers that both should fall; the circumstance, however, which was of most importance to the country, and which at that time could not be foreseen, was, that the wool, the growth of France bore the same price with that from Spain.

The breed which the Reporters here allude to, is repeated crossings with the best Merino rams, and some of the finest woolled sheep of their own country, as well as with the best Merino ewes; in the latter case, it was pretty evident, that the offspring from the original Spanish race had maintained its superiority through the several generations down to the period of the report.

In order that the breed of sheep throughout that kingdom might be improved to the utmost extent, a fair was established at Rambouillet for the sale of this national wool, and of those particular sheep, (that is of the improved breed from the Merino.) That fair was held for the first time on the 19th Prairial (which answers to the 7th of June.) Although it was announced to be held at a very short notice, it was found that they had sold 15,000 pounds weight of wool, and 3000 sheep. We are satisfied they have good bargains. Here then is a way to facilitate the amelioration of wool, because those who possess this breed are sure of a market to sell their produce as well as their sheep.

The French have also national establishments of the same nature at Pompadour, and at Perpignan, for the same laudable purpose.

cause, there is only the intervention of these mountains between their establishment at Perpignan, and those parts of Spain where these celebrated flocks are found in the greatest abundance and purity; and because there is a vast tract of rich and opulent country through the Lyonnais, on the road as it were to their grand establishment at Rambouillet, where there can be no difficulty of dispersing or disposing of not only the sheep, but also the wool.

England is situate between  $50^{\circ}$  and  $56^{\circ}$  north latitude, and between  $2^{\circ}$  east, and  $6^{\circ} 20'$  west longitude.

Silesia is situate about  $51^{\circ} 15'$ , north latitude, and  $17^{\circ}$  east longitude.

Upper Saxony is situate between  $54^{\circ} 43'$ , north latitude, and  $21^{\circ} 35'$ , east longitude.

Sweden is situate between  $56$  and  $69^{\circ}$  north latitude, and between  $10$  and  $30^{\circ}$  east longitude.

If we attentively examine the relative situations of these several kingdoms, and the spot where the Merino flocks have been so many years established; and from whence it is proved that we draw our entire supply of Spanish wool, it will appear that England is the precise spot that is best calculated to produce the finest fleeces in the greatest abundance, and at the same time to grow the largest mutton. We have none of those violent and excessive heats which prevail in Spain and France during the summer months, which oblige the flock-masters, in the former kingdom particularly, to drive their sheep annually at the commencement of that season from the interior and more southern parts, to the

mountains in the northern, a great distance and at a heavy expence and risk; not only for the benefit of the air, but for the very material advantage also of procuring even a scanty subsistence. In France also, the pastures are frequently so burnt up by the heat, as to oblige the farmers frequently to sell off their stock before they are fit, or they otherwise would; and to support the rest with dry fodder.

In Silesia, in Saxony, and in Sweden, whatever advantages they may possess over the preceding kingdoms, during the summer months, it must be admitted that they fall very short of them during the winter. In the former countries, the idea or the practice of housing their sheep, and feeding them with heath, ling, hay, or straw, is never once thought of. They are brought into the interior, where they ramble the pastures without any shelter in all weathers, and occasion very little trouble to the shepherds. In the latter the pains and the attention must be uniform and constant in the morning and the evening; and yet, with all this trouble, such is the value of these sheep, that we have the most undeniable and unquestionable proofs, that they are every where in these countries increasing, and bid fair almost, I had nearly said entirely, to extirpate the native breeds.

In England, we have a climate perfectly congenial to the constitution of a sheep; we have among men of skill and science (which, thank God, are more diffused over this country than over any other under the sun) in agriculture, the knowledge and the practice of providing a variety of successive feed for every season in the year; we have a certain

management too with our sheep, which no other country has, that makes them profitable to the ground on which they feed; and we make them more profitable in the carcase, even if it should be proved that we fall short in the quality of the wool.

With such a climate then, and under such management, what is there to hinder our farmers from making our sheep to equal the Spanish in the quality of the wool, to exceed them in the quantity, and to rival the very best of our own short woolled sheep in the weight and shape of the carcase? We see by Mr. Fink's very masterly report, and I am proud to confess I never read any thing that appeared more convincing, or more congenial to my way of thinking,\* that the quality of the wool depends altogether upon selection, and not on food, but that an abundance of the latter through all seasons will greatly increase the quantity. Then as to the shape and weight of the carcase, with a propensity to fatten early, he says positively, that the same rule will hold good, namely, selection; and to be effected by quantity and quality of food. And he further shews how speedily the want of selection, and quality and quantity of food will degenerate the primest stock.

In confirmation of the opinion which I have stated with regard to the improvement likely to take place in our breed of sheep by crossing them with the Spanish sort, I shall present my readers with a few extracts from Lord Somerville's *Facts and Observations relative to Sheep*, and Mr. Bart-

\* I had written my sentiments upon this subject before I thought of reading the communications to the Board of Agriculture.

Joy's Letters on Fine Clothing Wool: and if my readers should think I have trespassed too much in the length of these, I shall look for my excuse in the high importance of the subject.

" \* The Bath and West of England society, having, at its last annual meeting, been pleased to express its unanimous approbation of the measures I had taken to ameliorate the fine wools of this kingdom, and of the stock, as well of Spanish as English breeds of sheep, there exhibited—in conformity with the promise then made, I shall have the honour of submitting to the society's inspection, at its annual meeting in December next, additional proofs of our success. The stock will consist of the Merino breed, and its crosses; the sire was Spanish, consequently the produce is of the half blood.

" Two wether hogs, half South Down, and Spanish.

" Two ditto, half Ryland and Spanish.

" Two ewe hogs, ditto, ditto: these are from the flock of which the wool, manufactured into broad cloth and kerseymere by Mr. Joyce, obtained, two days ago, the recommendation of the committee for premiums adjudged this year by the society.

" Two ewes, Spanish.

" Two Mendip ewe and wether hogs.

" One Spanish ram, just taken from the flock.

" There was at first a difficulty in knowing how

\* Lord Somerville's Observations on Sheep, &c. published by Miller, 1803.



to ascertain the value of these wools. A fair times price of 1s. 10d. per pound, was set on the native South Down, and 2s. 2d. on the Ryland wool, untrinded. Strict comparison was then made between the quality of the mixed and native produce; the half South Down was valued at 3s., and the half Ryland at 3s. 2d. per pound, of clean washed wool. They were purchased by an eminent wool-stapler in Southwark, and carefully examined at home before they were packed. The result was most satisfactory, and the report of your committee just now made, has stamped a decided value on them far beyond my hopes.

"Mr. Joyce, in his letter, this day come to hand, says, "I inform you with great pleasure, "that the blue cloth and white kerseymere I have "manufactured from your lordship's wool, were "by the committee at the Bath meeting, yesterday, "awarded for the premiums of class 5, premium 4, "page 50; and inclosed I send you a statement of "your wool, when sorted and manufactured, where "it will appear that your wool has less F's and T's "in it than any wool that has yet been manufac- "tured for the society, being both only 7 lb. from "36 fleeces of 96lb. much less than what are "usually thrown from Spanish wool. The cloth "and kerseymere I will exhibit again at the annual "meeting. I have the honour to be

"Your lordship's obedient servant,

"THOMAS JOYCE

September 10th. Account of wool received  
from Lord Somerville, from his half Ryland and

" half Spanish breed of sheep, 30 fleeces, weighing  
 " 96 lb. which, when sorted, were as follows:

89 0 R.

6 8 F.

0 8 T.

---

96 0 lb.

" 47 lb. of the R, when washed and manufactured,  
 " produced 28½ lb. of navy blue cloth; the re-  
 " maining 16 lb. 6 oz. of the R, when manufac-  
 " tured, made 25 yards of uniform white kersey-  
 " mere."

" The sires of these sheep were good in their  
 frame: one of them has been let out this year at  
 100 guineas for the season only. His wool, appa-  
 rently, is not of the finest quality; we had many  
 better; but the goods manufactured are evidence  
 sufficient of the value of this breed, as applied to  
 our manufactures, did not the small proportion of  
 second and inferior wool put the matter beyond all  
 dispute.

" Eighty-six ewe hogs of this mixed breed car-  
 ried two hundred and thirty-five pounds three ounces  
 of well washed wool, which, at 3s. 2d. per pound,  
 amounted within a very few shillings to thirty-seven  
 pounds per pack. After the committee's decision;  
 its value may safely be rated at 3s. 6d. per pound,  
 forty-two pounds sterling per pack. The cross  
 with our South Down sheep, both with respect to  
 the frame and wool, keeps pace with that of the  
 Ryland. Having a flock of each sort, I am unable  
 to give the preference to either.

“The Ryland sheep are one-third less in size, on an average; and we can stock one-third more in number per acre. If we esteem the Ryland as good nurses to their lambs, we must value the South Downs as healthy and quiet stock. The crosses from each bear the same proportion in stocking per acre, to the parent stock, and lose nothing either in size or weight. The half Ryland half Spanish hogs are larger in size than Spanish or Ryland fall-mouthed sheep. Why this is we know not. They partake of the docile temper of the Spaniard. Fifty Mendip ewes were bought in, not as a store flock, but with a view to ascertain the effect of this cross on a horned breed: Their size, the quickness of their proof, or aptitude to fatten, and the excellent quality of the meat, can bring no discredit on this breed, which is already high in estimation. The same may be observed of the South Down and Ryland crosses, with respect to value of mutton. We may, without much indiscretion, anticipate the society's judgment of these admixtures, and declare them to be fortunate, and in every point of view most beneficial to the public. The wether hogs are not more than nineteen months old; and the ewes having dropt their lambs late in the season, owing to the late arrival of the rams in England, the lambs were weaned on the hills bordering on Exmoor, where our sheep are summered. The climate was too severe, and the lambs were stunted or steep in their growth; nor could they be made to move again before the month of October, so that the sheep can only be said to have a twelve-month's growth. Under these circumstances, we

trust, it will appear that they have the means of coming to market, as good meat, and at an age as early as the public interest could demand, namely, from twenty to twenty-four months old. It has been deemed the criterion of a good and profitable breed of sheep to ripen early, because there is room to multiply such breeds; far beyond those of slower proof. If a sheep can come to market at two years old, his fleece will be long enough for our manufactures, and not sold at an inferior price as skin wool; much before this period it would be unfit. The growth of any high proof breed of sheep, is far greater the first and second than the third year; therefore it may be urged, that more profit can be had from the animal at this time, than at any later period, its growth and fleece considered. If attempts had been made to bring into general use a breed of sheep, whose fleeces were of value, but incapable of getting fat, we should be receiving with one hand, what we were throwing away with the other; no general benefit could result; but when we bring sheep bearing such heavy fleeces, and that wool capable of making broad cloths and kerseymeres, of quality sufficient to obtain the society's premiums, and of a proof or aptitude to fatten, equal to, if not exceeding, any short-woolled sheep we have, the principle is no longer to be controverted; it becomes a breed of extreme value. Proof, that both these objects can be obtained, will be set before you. No desire of change, or love of innovation, led me to abandon the long-woolled sheep of my own neighbourhood, the Bampton breed, dashed with the new Leicester;

an undoubted improvement was visible from an introduction of the new Leicester; but there was a prejudice so strong among our butchers against the latter breed, that we were compelled to look to Bristol market for purchasers at the distance of fifty miles from home. This stock continued to decrease in size considerably, in spite of all attempts, consistent with profit, to maintain it, notwithstanding fresh rams were three times brought from Leicestershire, in the twelve years these sheep were in my possession; the loss of size in each four years amounted nearly to five pounds per quarter. It will naturally be asked, what sort of poor hungry soil this must have been, which could not maintain such sheep. It was the vale of Taunton, proverbially known to be one of the most fertile spots in this kingdom; and much of the grass land, in which these sheep were depastured, was equal in strength to any in the vale: it stands valued at £2. 15s. per acre. A man must be blind, who could withstand such evidence as this. Nature pointed out, that the stock was too coarse in quality, or our climate unfit, it matters not which: the fact was plainly marked, and it was merely an act of common prudence to follow her dictates. How many thousands, how many tens of thousands of acres are there in Great Britain, which stand exactly in the same predicament! These sheep were sold; and the same land, which carried forty-five breeding ewes, was immediately stocked with 150 Rylands in their stead. The neighbours said they would all be starved; the winter was severe, but the ewes maintained themselves moderately well.

and their lambs, at weaning-time, were in the very best order. The ewes were stocked, during the succeeding summer, at the rate of ten per acre, and came back into the vale in good store state.\* One lot of these two tooth sheep was bought by a farmer in the neighbourhood, and put in turnips; between Candlemas and Lady-day they were all killed, and on an average they turned out more pounds of rough fat than they were pounds per quarter. Land of the vale of Taunton might have supported coarse-woolled sheep in size, had they

\* Their lambs were summered on the same upland sheep farm, at more than the rate of twelve per acre; and although this appeared to be a stock too thick, the quality of the land and climate considered, yet they returned into the vale, in October, in a growing state, were stocked almost as hard during the winter and spring (for our turnips were bad); and so far from having suffered in size, the ewes were as good in their points as the parent stock, and the wethers have since reached a size, when fat, that sheep of this breed have not been thought capable of. One lot, killed in 1802, at Taunton, is said to have died above 16 lb. per quarter. It is an acknowledged thing, that butchers were in judgment of them below their weight, almost 4 lb. per quarter, and that the fifth quarter was excellent, beyond what we are at liberty to talk of. A small one was rejected from the lot; and besides, as well shaped and fat a carcase as need well be seen; was broad over the loins, thick through the chine in meat of the best quality, was unusually well turned in the leg of mutton, and fine of bone; the sheep carried 12 lb. of rough fat, or tallow, besides kidney fat. Their fleeces were heavy, and of the best quality; the wool sold, in 1801, for 2s. 4d. per pound, trindled, a first-rate price. In 1802, for 3s. 2d. untrindled. A pen of these wethers were kept on to this time, and will be killed at the Barbican show. Their weights will hereafter be given.

We have been particular in tracing the progress of these sheep, tediously so, perhaps; but the importance of the subject must be our excuse.

been pushed in first year's grass, or buried in red clover up to their eyes, and the refuse mown afterwards for hay; but this was buying a good thing too dear; it is not the size of individual sheep, but the quantity of good meat and wool, per acre, which must enrich the farmer, and feed the public. It is to be lamented that we are such slaves to size, and that the eye can hardly resist it. A medium is most desirable; but if extremes are to be admitted, without a doubt the small sheep, fine in its grain, is a more marketable commodity. The rich will have it, because its quality is superior; in short, because it eats better; the poor man will find its joints more adapted to the strength of his purse; and the dearer meat is to be, the more this argument applies; for legs and shoulders of mutton cannot conveniently be cut, and retailed in pieces. There remained, then, but the manufacturer, the mechanic, and the middle class of housekeeper, to prefer coarse-grained meat; so we reasoned when we first sent this Ryland mutton to market; but these were the very people who greedily bought it at a penny per pound advance in price, and that, too, in a manufacturing district. But we are told that sailors, colliers, and keelmen, are sure customers for these over-fat joints; so they are, and long may they enjoy them! Fresh meat is fresh meat, to a man coming from sea, but if he stays long in harbour, and were once to break pale, and get a taste of better mutton, perhaps it would be no easy matter to bring him back again. We are told, too, that coarse fat mutton is best for salting; mutton is not at all well suited to this purpose;

beef and pork take salt better. If men are to be kept on salt meat, be it so; if they are to live on mutton, let that be good in quality. One of the first cutting butchers in London has often been heard to say, that he could not afford to buy fat coarse-grained sheep; for that, besides the loss in spine fat, which he was obliged to cut from roasting joints, there was not lean enough to support the fat, which therefore roasted away; and that so long as meat bears a better price than tallow, so long he must deal in South Downs, and sheep of that description. We have said thus much, because false arguments are too often used to enforce adoption of heavy sheep, in districts ill suited to them. Where land is deep and strong enough to bear long-woolled sheep, there let them be bred; but let them not be foisted, by false arguments, on land unable to maintain them; by so doing, the public is most essentially injured. Our combing and coarse wool manufacturers must be supplied, and therefore our strong land should be allotted to carry coarse, heavy sheep; but if, on the same false principle, one is to be pushed every where to the exclusion of the other, I, for one, am old-fashioned enough to prefer clothes to carpets, a necessary to a luxury. If carpets are to be exported, well and good; they may, perhaps, pay as well as coarse woollens sent to South America, or elsewhere; but if carpets are to be consumed at home, as they have been for some years past, the manufacturer, indeed, is fed by what he earns, but for any addition to the national revenue, he may as well sit with his hands behind him, and at once be fed from the



pocket of the richer classes: it is only receiving with one hand, and paying with the other; the nation will not be enriched; and the same thing may be said of every article of luxury consumed at home. This is very unfashionable doctrine, without doubt; but it is too true. In treating of Ryland sheep, it may not be amiss to remark, that they are not a mountain sheep, as many suppose, but are bred in the vales of Hereford and Ross, on the very same land with the Hereford oxen."

"The Merino fleece is in colour unlike that of any English breed. There is a dark brown tinge on the surface of the best fleeces, amounting almost to a black, which is formed by dust adhering to the greasy yolk properties of its pile: and the contrast between it and the rich white colour within, as well as that rosy hue of the skin, peculiarly denoting high proof, surprise at first sight. The harder the fleece is, the more it resists any outward pressure of the hand, the more close and fine will be the wool. Here and there a fine pile may be formed with an open fleece, though but rarely. Two seasons ago, some Merino wool was sorted into R's, F's, and T's;\* the broad cloth and kerseymere manufactured from it were durable and excellent articles in wear; the remainder was sold at a guinea per fleece; and none has yet been sold for a less

\* The distinctions in the several sorts of Spanish wool are understood or described by these letters. The R is a sort of corruption from *Primero*, which is sometimes written I. R. O. or it stands for the word *Rafino*. The S implies *Segundo*, and the T *Tercero*. When the F is substituted for the S, the segundo is distinguished as the *Fino*.

price. In 1801, the fleeces weighed, on an average, rams, ewes, and ewe hogs, six pounds eight ounces each in the grease; in 1802, seventy-nine fleeces sold for seventy-nine guineas, the weight somewhat less; but every sort of wool in the kingdom is said to weigh less this year than usual, probably occasioned by the cold and dry winds of April and May, which did not allow the yoke to rise; but as it weighed less, so it is admitted by the woolstaplers, that its quality was improved. If we read the late Report of your Committee, and attentively consider the small quantity of waste and second wool in the fleeces of half Spanish and half Ryland sheep, we have no right to suppose these Merino fleeces dear at one guinea each.

“ No attention has been paid in Spain to the form of their sheep; and it must be evident to every judge of stock, that a journey from the mountains of the north, to the plains of the south of Spain, cannot be otherwise than productive of more injury to the frame and constitution of the animal than of benefit to the fleece, which, like the frame, is dependant on, and nourished by, the blood. Does it stand to reason, that a long drift of four or five hundred miles every spring and autumn, and that at the rate of 80 and 100 miles per week, can be beneficial to sheep?—Undoubtedly not. Have we a single breed which could support it uninjured?—None, which would not have been hunted into deformity. So far from thinking hot climates necessary to fine wool, we know that coarse fleeced sheep are to be found in many parts of Spain; that in Portugal, wool, unmixed with Merino blood, is of the

coarsest quality, worth about 1s. 2d. per pound. We know, too, that after shearing every pile is coarse, and improves both to the eye and the touch, as the autumn advances. No race of sheep has ever been seen, even in this northern climate, to be more impatient of heat, or more oppressed by it, than the Merino. By due attention to food; by moderation and equality of keep; by shelter in the winter months; and by those common regulations, which induce health in the animal itself, we shall stand as high as to the produce of wool and meat as any nation in Europe. Hence we may suppose it is, that Dr. Parry continues to demonstrate that improvement on the Spanish pile, which is so strongly pointed out by the last Report of your Committee. One inference may be clearly deduced from the long drift and yolky fleece of the Merinos; namely, that they are equal, if not superior, to any breed in these kingdoms, as a flock to work in the fold. We may add, that the length and thickness of wool covering their belly and hind legs, together with a closeness of pile on the back and loins, must of necessity enable them to support more severity of cold and wet than any breed as yet introduced among us; unless we admit, that length and fine wool are inseparably connected with weakness of constitution, which evidence from all quarters forbids us to do.

“ Nothing has tended to render the Merino sheep more unsightly to an English eye, than the large tuft of wool, which covers the head. This wool is of a very inferior quality, and classes with that below the hock of the hind legs. It does not sort

either into the R's, F's, or T's and is not thought worthy to be exported. It has been our practice to keep the wool of both these parts of the sheep clipped twice or three times a year; the first time about six weeks after shearing. The fleece, although reduced a few ounces in weight, loses very little of its value; and if the cats-hair should appear in the head locks, without being visible in any other part of the fleece, which sometimes occurs, the fleece is rescued thereby from a very great drawback in its value.

“Lest it should be surmised that the facts here stated, and the conclusions which every judge of sheep will thence be led to draw, should have been formed on a scale of practice too confined, it is advisable to suggest, that the flock consists of 340 breeding ewes, and the whole produce, at two years old, is fatted off, with the exception of such draft ewes as may be sold for stores; consequently, the number of sheep is from 1000 to 1200; a scale not of the largest, but still large enough with safety to warrant any inference that may be drawn. The lambs are dropt in the vale of Taunton, and continue in it during the first summer. The store flock is summered a short distance from thence, on the hills before mentioned, bordering on Exmoor Forest. The contrast of climate must be remarkable, because there is a difference in the time of harvest of a month: our feeding sheep are then grazed in the exposed but rich marsh of Bridgewater, long celebrated for its good beef and fat oxen; or finished in turnips and winter vetches in the vale. We had reason to fear, in either case, that the strength of

keep might open the pile, and give a coarseness to the wool, as well as to the grain of meat; but the event has destroyed such fears, inasmuch that we had no scruple in sending some wether lambs to winter in the marsh, using the precaution to coddle them during the severe winter months; and although this land had the character of being too strong, and of scouring lambs, even to the danger of losing them; we found the mixed breed able to endure it, and thrive surprisingly.\* Whether as an article of food for those who are robust, or those who are delicate, even at the early age of 18 months, when mutton is usually thought indifferent, it is nutritious and exquisite in flavour. There is a firmness in the spine fat; a richness and deep colour in the gravy; and a fine texture and tenderness in the grain, which must command customers, and ensure to this breed the good will of butchers, wherever they may be situated. There are two parties to be considered; the seller and the purchaser. We have had occasion to note, how essential a ready sale is to every article of produce, and that this circumstance, in great part, tended to enforce the necessity of a change of breed. These diversities of soil and climate, unequalled probably within the same space of ground, enable us to speak with a confidence, it would be presumption otherwise to do; because together they embrace all those leading varieties, which, some certain spots excepted, are to be found in the whole United Kingdom.

\* They did well until the end of December, when keep getting scarce, the grounds were hained up for a fresh bite in February.

The quantity of stock here stated to run per acre, may appear great to many persons: some may be disposed to doubt the facts. Every possible precaution to ascertain them has been taken; and to speak with as much accuracy as can be, where we are to reason on an average. My wish was not to deceive myself; I trust it is not in my nature wilfully to deceive others. The Ryland sheep, alluded to, were summered at 2*d.* each per week, by my own tenant that season; we knew the fact to be correct, which he has repeatedly confirmed by declaring, that it was the exact average rate per acre. In the marsh, such a stock, in point of numbers, of fat and store sheep, has been carried this season, as would be found almost to exceed belief. The fattening wether hogs and draft store ewes, which must be, to make the most of them, kept as high as fat sheep, amounted to more than four per acre, during the six summer months; the store ewes amounted to more than two per acre, and were large, strong South Down ewes, of Mr. Elman's blood, in all more than six per acre, besides refuse lambs, &c. and nothing could exceed their proof. In the winter of 1800, the vale estate carried, from the beginning of September to the first week in June, 700 store sheep, about 250 lambs included, on one hundred acres of pasture land, of which sixty were indifferent, and forty as good pasture land as could be seen: the ground carried more stock; probably from the mode of depasturing. Where sheep work in the fold, they must run in large lots; and some loss per acre in the stocking may be incurred, because the profit of the fold is

great ; but where folding is not practised, and the country much enclosed, sheep should be stocked in small parcels, thin on the ground, and frequently changed ; the land thereby is not stained, and one lot follows another in perpetual succession. Every judge of stock knows the value of change, even, occasionally, into worse keep. It is our fixed belief, that we can carry six and a half Rylands, or half Rylands, per acre, on land (free of any local consideration) worth one guinea and a half per acre, with the help of some turnips and pease-haulm in the dead winter months ; and that with judgment in the manner of stocking we shall neither push them beyond their growth, nor make them meat for the butcher, but shall maintain them in healthy store state. On the same land, and under the same circumstances, we can carry four South Downs, or their cross, and somewhat more per acre. If our Ryland ewes will fat to twelve pounds per quarter, our South Downs will reach nearly eighteen ; the rate of stock per acre will therefore be found the same in proportion to the size.\* The quantity of good mutton and wool per acre must be the only test of good or bad management ; it is on the increased stock of South Downs, which his estate in Norfolk now carries, that Mr. Coke prides himself. A noted husbandman from Nottinghamshire is said to have declared, that he never before saw an estate so stocked.

“ The South Down Stock, which is now reared on a farm of the Duke of Bedford, called Maulden,

\* The wethers of each breed will be, of course, some pounds heavier per quarter.

in Bedfordshire, the nature of the land considered, will be found to exceed that, which belongs to myself. A very few years ago, great part of this estate was wild unproductive heath, valued at 2s. 6d. per acre. A Norfolk farmer was invited to take it, but declined any engagement, at any price. Four hundred acres of it have been broken up. Its situation was such as to preclude all extra manure, therefore the estate is making itself by the sheep-fold. It now carries 400 breeding South Down ewes; the stock amounts to 1200, and the fat sheep finished on the same; there remain about 150 acres only of heath to break up, at which time the estate will carry 1600 sheep. The South Down stock is large in size, and of the first rate quality; the land cannot now be valued at more than ten shillings, and the stock three per acre, winter and summer. We should rejoice to see any improvement more substantial or more beneficial than this; for it is to be remembered, that in proportion as the sheep stock increases, heavier and better crops of corn will be grown. The average of South Down store stock on Mr. Elman's pastures at Glynde, he asserts to be four per acre. As his sheep are of the largest size, this rate of stocking will be found exactly similar to our own. He could not afford to starve his own sheep; because they are too valuable to make the difference of feed of the slightest consequence.

“ The question having of late been repeatedly asked, what proportion of the Merino blood it would be advisable to bring into the South Down breed with advantage? My answer has been, one



quarter, only, provided the outward semblance and character of the South Down is intended to be preserved; the Ryland being a white faced sheep, assimilates with the Merino more readily, and will bear one half, or even more."

" Mr. Lasteyrie says, that a Merino flock came into Sweden, in 1723; that from the year 1740, to the year 1780, a bounty of 75 per cent. was allowed to those who sold fine wool; in 1780, these bounties were reduced to 15, and in 1786, to 12 per cent; and in 1792, being no longer deemed necessary to encourage this breed, they ceased. In 1764, Sweden possessed 65,369 Merino sheep, of the pure blood, and 23,384 of the mixed blood; since that period they have constantly increased in number, in spite of the difficulty occasioned by the length of winter, and severity of the climate. That the Merino sheep preserve, in Sweden, their pristine form; that the fleeces have lost nothing of their equality of length, their elasticity and fine quality of pile; that their weight continues as great as in Spain; that he has seen Merino rams, whose fleeces weigh 13 pounds each; and that, when seasoned to the climate, and properly fed he has seen them larger and finer sheep than in Spain. Upper Saxony, he says, is the country next to Sweden, where the introduction of the Merino is of the longest date; and it is in Saxony where this naturalization has met with the most marked success, and produced effects the most beneficial: the native breeds have, by a mixture of Merino blood, profited in an equal degree. The first importation was in 1765; the next in 1778. Mr. Lasteyrie says, he

has seen many different flocks, and has found the pure Merino, as well as some mixed breeds, producing wool of the first quality; indeed the sheep-walks of Saxony are at this moment more productive than any other species of husbandry; and that the wool sells at three times the price (*une valeur triple audessus*) of the wools of the country. Saxony rears about 1,600,000 sheep, of which 90,000 are Merinos, and the mixed breed.

"They were introduced into Prussia by Frédéric II. in the year 1786. Some of these distributed over the country; from mismanagement and gross neglect, have degenerated and died; others he has seen which preserve their pristine qualities.

"In Denmark, and in various parts of Germany, Mr. Lasteyrie has seen this race of sheep always prospering, if well treated; and in this, and in every other country, degenerating from want of food, and neglect; always, however, doing as well as the native breeds in the same keep, and, in some cases, better; that the more regular and ample the supply of food is, whether of grass or green vegetables, the heavier and finer will be the fleece—the larger in size and more perfect in shape will the sheep be. He strongly recommends housing; but adds, that foul, close sheep-cots are injurious, that a free circulation of air is always found beneficial, and that this breed of sheep suffers more from heat than from cold. This doctrine has been repeatedly confirmed by our practice at home; that they will get fat as quick as any indigenous breed, in any country, and have done so wherever a comparison has been made."

“ The wool of some pens of wethers, as well as ewe hogs, were valued at the request of the judges; and from the adjudication of the prizes it is obvious, that this important part of the produce of our sheep did not pass unnoticed.

|        |                               | <i>s.</i> | <i>d.</i> |
|--------|-------------------------------|-----------|-----------|
| No. 1. | Wilts wool . . . . .          | 1         | 6         |
| 2.     | Ellman South Down ditto . . . | 1         | 11        |
| 3.     | Woburn ditto . . . . .        | 2         | 0         |
| 4.     | Maulden ditto . . . . .       | 2         | 1         |
| 5.     | Runciman ditto . . . . .      | 2         | 1         |
| 6.     | Smith ditto . . . . .         | 2         | 2         |

#### SPANISH CROSSES.

1st. With Ryland.

2d. With South Down.

“ The first we consider as the finest hair; but being more elastic we think it has less of the distinguishing character of Spanish wool than the second.

“ DANIEL LLOYD.

“ GEORGE WANSEY.”

“ It must not be supposed that the average value of the wool of each flock will be equal to the above prices; the sheep were drawn out with an attention to this particular point, and it is probable the price will be found to exceed by two-pence per pound, the prices which each flock-master will obtain. We are induced to throw out this hint, lest any person should think his produce undervalued, and

thereby overstand his market. There is strong reason to believe, that the manufacturers have, for three years past, maintained a trade, which demands both skill and capital, on very indifferent terms; and that their profits, notwithstanding cloths have risen within the last four months 1s. 6d. per yard, are scarcely seven per cent; a return wholly inadequate to the risk and trouble incurred. As we have heretofore resisted the wanton attacks of the trade on our endeavours to increase and improve the breeds of short-wool sheep; so again, motives of justice, as well as interest, dictate to us, that if too high a price is set on the raw article, and an adequate profit does not belong to the manufacturer, it may cease to be manufactured altogether.

“The half South Down and Spanish wool was declared to be worth four shillings per pound; but taking into consideration the immense profit we draw from these fleeces at three shillings per pound, the quantity materially increased, and quality as materially improved, we shall content ourselves with such prices for the wool as will enable others to draw their share of profit from it when sent forth manufactured.

“These efforts to improve the wools of Great Britain by every possible means, originated in a fear, that the Merino wool might, through the influence of France, either be denied to us wholly, or might come so fettered by duties and intermediate charges, as would paralyze our manufactures, if not wholly destroy our trade. We have incurred the sneers of thousands by such fears; an edict to

this effect has at length passed; a *Weekly Journal*, well informed, in general, of what is passing on the Continent, says, in its Number of March 5th, 1803, "*Our dealers in Spanish wool have, to their great surprise, found that there exists in Spain an edict, prohibiting the exportation of wool, except it be sold to a Frenchman—and we believe, unless it be shipped first to France also.*"

"If this edict has passed, the most flippant and sanguine speculator amongst us cannot construe it otherwise than as a measure most hostile to our trade; we regret that it is so, but we draw consolation from the contents of the foregoing pages, which deal out, not opinion, but facts; which go to prove, that this blow at our national prosperity, like every other, may be warded off—that it may be defeated by the spirited exertions of the landed interest; that we may, in spite of the world, produce this treasure on our native soil.

"This subject has, at last, excited a more than common interest, and numberless questions are asked as to the return or profit per acre, on clothing or fine wool; this will depend on the nature of the keep; if sheep are to run on pasture land only during the whole year, so much will depend on the nature of the seasons, that no fixed value, or specific rate of stock, can well be given. If a large portion of this grass is to be kept hained up for winter, and the season be not favourable, autumn rains followed quickly by frost, will kill very much of the foggage, and the sheep will consequently be very hard driven for food from Candlemas to the next shoot of grass, however late that may be. The quantity

indeed, of stock to be carried per acre, as well as their health and good condition, must be in proportion as there is more or less produce; and on the competent and regular supply of food the growth of good wool wholly depends. South Down store ewes, at three pounds a fleece, and at one shilling and ten pence per pound, will pay five and six pence per fleece; which, at six and a half sheep per acre in good upland pasture for seven months, and five months in turnips at the rate of fourteen or fifteen per acre, will pay thirty-eight shillings or two pounds per acre. Ryland, ditto, two pounds and a quarter a fleece, and two shillings and two pence per pound, untrinded; nine sheep per acre, turnips in the same proportion as above, will pay two pounds three shillings and ten-pence halfpenny per acre. South Down and Merino ewes, of the half blood, at four pounds a fleece clean washed and at three shillings a pound, will amount to twelve shillings each fleece, which, at seven and a half per acre for seven months, amount to four pounds ten shillings per acre for the pasture land, with turnips for winter keep. The store ewes of Ryland and Merino half blood, at ten per acre for seven months, and turnips in proportion as above, at three pounds and a quarter each fleece, at three shillings and two-pence per pound, or ten shillings and three-pence halfpenny a fleece, amounts to six pounds ten shillings and five-pence per acre.

“Doubts have arisen as to the possibility of any return, such as this, to be had from wool. What then will be said of the pure Merinos? Why, that their fleeces have never been sold at less than one

guinea each; that the weight averages more than six pounds each, in the yolk; that on the above allowance of pasture for seven months, and turnips in aid of that pasture, the return shall be ten guineas per acre. Mr. Lasteyrie says, that a ram was shewn last year at Rambouillet, whose fleece weighed sixteen pounds; that some other flocks have given fleece of the same weight; and a table which he has given, demonstrates, that the average weight of the Merino fleece is from seven to eight pounds each, in the grease; setting the price at three shillings per pound only, the fleece becomes worth more than one guinea; if it were necessary to bring additional proof of a statement which is known to be correct, we are ready to allot some acres of ground to this purpose, and again to prove the fact: but as the proportion of stock, both of the mixed breeds and pure Merino, with the parent stock of South Down and Ryland sheep is well ascertained, we have, and can have, no further doubts on the subject: the wools from each sort actually will weigh these weights (and we have more than proved it, regard being had to the scanty growth of wool last spring,) and they have actually sold for these prices, which are still considered by the trade as moderate. We are not now stating a return always to be made under careless and bad management, but what can be made, if every attention be paid. Few can form a calculation how much the water meadows in Hampshire and Wiltshire pay per acre when they are hurdled off in cuts, and fed by couples in the spring months; the scarcity of keep at that season of the year, and its value, enforce the necessity of thrift; every blade of grass is

then of consequence; and the profit made of these meadows wonderful. We refrain from any comparison between the profits of long and short wool: on Lincolnshire and Leicestershire land if Lincoln and Leicester wool be grown."

Before I proceed with the extracts from Mr. Bartley's work, I shall lay before my readers an account of the produce in wool and meat of some sheep of my Lord Somerville's, with which his Lordship has favoured me.

*Account of Lord Somerville's Sheep and Wool, &c.*

November 9. 1802.—30 fleeces, from half Ryland and half Spanish breed of sheep weighing 96lb. which when washed and sorted, were as follows:

|       |   |   |
|-------|---|---|
| lb.   |   |   |
| 89    | 0 | R |
| 6     | 8 | F |
| 0     | 8 | T |
| <hr/> |   |   |
| 96    | 0 |   |
| <hr/> |   |   |

The above when scoured and sorted were reduced to

|       |    |   |       |    |                                    |
|-------|----|---|-------|----|------------------------------------|
| 63    | 6  | R | 89    | 0  | R                                  |
| 4     | 10 | F | 63    | 6  | R                                  |
|       |    | 8 |       |    | T                                  |
| <hr/> |    |   | <hr/> |    |                                    |
| 68    | 5  |   | 25    | 10 | lost in the operation of scouring. |
| <hr/> |    |   |       |    |                                    |

47lb. of the R. when woaded and manufactured, produced 28½lb. of navy blue cloth, the remaining 16lb. 6ozs. of the R. when manufactured made 25 yards of uniform white Kerseysmere.

Six sheep were clean washed and shorn at Plaistow in Essex.

lb. ozs.

- No. 1. Merino ewe produced of wool 4 0
2. half South Down ..... 5 3
3. half Ryland wether ..... 5 8
4. half ditto ditto ..... 5 1

E E 2



|                                    | lb.   | ozs.                        |
|------------------------------------|-------|-----------------------------|
| No. 5. half South Down, ditto .... | 5     | 8                           |
| 6. half ditto ditto ditto ....     | 4     | 12                          |
|                                    | <hr/> |                             |
|                                    | 30    | 0 at 3s. 2d. per lb. £4. 10 |

~~Manufacture of Black Cloth~~

The following sheep came direct from Spain, their fleeces were much fouled on board ship, and with their journey through Spain.

20 fleeces washed, scoured, and sorted, weighed 104lb. in the grease or yolk—produced  $34\frac{1}{2}$  yards of brown cloth, 7 quarters full breadth wide, independent of coarse wools otherwise employed.

The following three lots of Merino wool yielded as under :

|                                        | lb.   | ozs. |                                                                                                                                    |
|----------------------------------------|-------|------|------------------------------------------------------------------------------------------------------------------------------------|
| 15 fleeces weighed, in the grease .... | 82    | 0    |                                                                                                                                    |
| Scoured twice over .....               | 47    | 4    | $\left\{ \begin{array}{lll} 31 & 12 & 0 \text{ R.} \\ 13 & 0 & 0 \text{ F.} \\ 2 & 8 & 0 \text{ T.} \end{array} \right.$           |
|                                        | <hr/> |      |                                                                                                                                    |
|                                        | 47    | 4    | 0                                                                                                                                  |
|                                        | <hr/> |      |                                                                                                                                    |
| 15 fleeces weighed, in the grease .... | 76    | 0    |                                                                                                                                    |
| Scoured .....                          | 39    | 4    | $\left\{ \begin{array}{lll} 30 & 0 & 0 \text{ R.} \\ 4\frac{1}{2} & 8 & 0 \text{ F.} \\ 4 & 12 & 0 \text{ T.} \end{array} \right.$ |
|                                        | <hr/> |      |                                                                                                                                    |
|                                        | 39    | 4    | 0                                                                                                                                  |
|                                        | <hr/> |      |                                                                                                                                    |
| 10 fleeces weighed in the grease ....  | 53    | 0    |                                                                                                                                    |
| Scoured .....                          | 29    | 4    | $\left\{ \begin{array}{lll} 21 & 12 & 0 \text{ R.} \\ 6 & 8 & 0 \text{ F.} \\ 1 & 0 & 0 \text{ T.} \end{array} \right.$            |
|                                        | <hr/> |      |                                                                                                                                    |
|                                        | 29    | 4    | 0                                                                                                                                  |

N. B. The 40 fleeces weighed 211lb. in the grease, which were scoured down to 115 $\frac{1}{2}$ lb. which averages  $5\frac{1}{2}$ lb. each fleece; which at 5s. 6d. the lb. for the whole R. F. and T. makes the total value of them £31 12s. 6d.

These fleeces were selected as the lightest and least valuable; and those last imported wasted the most. They were manufactured into black cloth.

# Sheep.

421

Mr. King, carcase butcher of Newgate market, killed and sold the four following sheep for Lord Somerville in 1804; their weights were as follows—

|                                      | alive.                    | dead.                 | fat.     | skin.    |
|--------------------------------------|---------------------------|-----------------------|----------|----------|
|                                      | stone.                    | lb. ozs.              | lb. ozs. | lb. ozs. |
| No. 1. half South Down } Sheep ..... | 18 0                      | 144 10—85 0—14 0—15 0 |          |          |
| 2. ditto, ditto, ditto..             | 18 1—145 0—86 0—15 0—16 0 |                       |          |          |
| 3. ditto, Ryland ditto               | 15 6—126 0—76 0—10 0—14 0 |                       |          |          |
| 4. ditto, ditto, ditto               | 15 0—120 0—68 0—14 0—14 0 |                       |          |          |

Total .. 56 7 315 0

The four carcases sold for..... £9 16 0

The four skins and fat, &c..... 3 1 3

12 17 3

Cr. for expence in killing and sale ..... 0 5 0

£12 12 3

The above 4 sheep were altogether grass fed, without any oil cake.

The following is the clip of 1805 :

No. 6. old rams very handsome and fine.

|             | lb. | ozs. |
|-------------|-----|------|
| No. 2 ..... | 10  | 12   |
| 4 .....     | 10  | 0    |
| 11 .....    | 9   | 14   |
| 16 .....    | 8   | 12   |
| 18 .....    | 9   | 4    |
| 20 .....    | 8   | 2    |

21 ..... 7 8

22 ..... 7 6

23 ..... 6 8

24 ..... 7 6

25 ..... 7 13

26 ..... 6 8

27 ..... 7 8

28 ..... 9 0

29 ..... 6 4

The Merino ewe, hog cut 6 4

The half Ryland hog .... 4 4

The old Merino ewes ... 6 4

All the above are in the yolk or grease.

I shall now proceed with the observations of Mr. Bartley: "It has been mentioned, says that gentleman, as an objection to the introduction of Spanish sheep, that coming from a much warmer climate, they would not well endure the inclemencies of our winters, without a laborious and expensive mode of management to guard against the effects of them, which after all could not be generally adopted, by reason of various local impediments.

"In point of fact, this objection seems not to apply in the slightest degree; on the contrary, from the experience I have had, (and I imagine it would be confirmed by all those who have had opportunities of similar experience) I cannot but conclude, they are hardier, and ~~pass over~~ our winter with fewer accidents than the general breeds of English sheep.

"The small stock of mine, about fifty in number, were exposed in a bleak situation, on ground considerably elevated, throughout the whole of the winter 1801, with snow at times on the ground, without any shelter or cover whatever, there having been no sheds or building of any kind on the premises, and yet I lost but a single lamb, and that in the birth.

"This is matter of fact, but the reason too seems obvious. In one instance, an animal with a carcase comparatively large, is defended only with 3½ lb. of loose set hairy wool, lightly floating with every gust of wind, and readily admitting to the body the various inclemencies of the surrounding atmosphere. In the other, a carcase of about half the weight or volume, is enveloped with about double the weight of clothing, which taken together, would be four-fold the defence of the other; the

coat also so close and compact, as to be completely impervious to the vicissitudes of the weather, to which a sort of cemented crust always adhering to the surface of the coat of these, not a little contributes."

"I beg leave to submit, as a probable conjecture, hereafter to be more fully appreciated, that the temperature of Britain, particularly to the race of fine woolled Spanish sheep, (for in Spain there are coarse woolled breeds) is more congenial than Spain itself.

"It is known that nothing is more oppressive to sheep than any excessive heat; as well as the relief they experience in the summer season when deprived of their fleeces; and the rapid progress in condition they subsequently manifest. May not one of the primary objects, in removing the Spanish flocks to be depastured on the summits of their mountains in the summer season, have been to relieve them from the oppressive heats of their plains? It is also well ascertained, that even in Sweden, flocks descending from sheep imported from Spain about a century ago, continue to preserve their original purity in every respect.

"But we need not resort to conjecture, or to foreign instances: in our own country all things rise in proof.

"It appears from the last Report of the State of his Majesty's Flock of Fine Woolled Spanish Sheep, that in the opinion of competent judges, the flock has been progressively improving from the first introduction of Merino sheep into this country in the year 1787; and that there is every reason to

believe it is still improving, insomuch that in a very few years it will equal, if not excel, the very best piles that have hitherto been imported into this kingdom; and that it is probable no pile in Spain throws out so small a proportion of F's and T's. That the prime, or R wool, of the ewe flock 1803, sold at 6s. 9d. per pound, and that of the rams at 6s. 6d.

"That the unwashed fleece of a ram descending from his Majesty's flock, belonging to Mr. Tollet, a Gloucestershire gentleman, weighed 11lb. 12ozs. and that he refused an offer of 200 guineas for such ram."\*

With regard to the crossing of breeds, particularly with the Spanish: "Doctor Parry has well exemplified the advantages of this improvement, in a Treatise of his, published by Mr. Cruttwell, 1800, and in which, I have reason to believe, the advantages suggested will be found on the strictest investigation by no means to exceed the limits of actual experience.

"Lord Somerville, in the year 1802, disposed of

\* Mr. Tollet sold the following fleeces in the yolk, to people who came to his house, and upon very easy terms.

|                      |    | lb. ozs. |          |    |       |   |         |    |   |   |
|----------------------|----|----------|----------|----|-------|---|---------|----|---|---|
| No. 1. ....          | 12 | 4        |          |    |       |   |         |    |   |   |
| 2. ....              | 11 | 3        |          |    |       |   |         |    |   |   |
| 3. ....              | 9  | 14       |          |    |       |   |         |    |   |   |
| <hr/>                |    |          | s.       | d. |       | £ | s.      | d. |   |   |
|                      |    |          | 33       | 5  | at 3  | 2 | per lb. | 5  | 5 | 9 |
| <hr/>                |    |          |          |    |       |   |         |    |   |   |
| Five rams' wool —    | 37 | 0        | at 4     | 3  | ..... | 7 | 17      | 3  |   |   |
| Five-cut rams washed | 31 | 10       | at 4     | 3  | ..... | 6 | 15      | 3  |   |   |
| <hr/>                |    |          |          |    |       |   |         |    |   |   |
|                      |    |          | £19 18 3 |    |       |   |         |    |   |   |

his fleeces to a woolstapler at the following prices, viz.

|                                     |         |         |    |     |           |
|-------------------------------------|---------|---------|----|-----|-----------|
| Ryland fleeces . .                  | 2s. 2d. | per lb. | or | £26 | per pack. |
| Half Spanish and<br>half Ryland.    | }       | 3       | 2  | —   | 38        |
| South Down fleeces                  |         | 1       | 10 | —   | 22        |
| Half Spanish and<br>half South Down | }       | 3       | 0  | —   | 36        |

Being an advance of 1s. per pound, or £12 per pack, on wool of the first cross ; besides which, the fleeces of the admixture had gained a full pound in weight each, beyond those of the original ewes.

“ In the same year I had twelve ewes shorn ; the fleeces weighed together 78lb. or 6½lb. per fleece on the average. These sheep descended from Wiltshire ewes, carrying fleeces of about 3½lb. only ; but by many repeated crossings, (the first and second by his Majesty’s ram) the descendants now approach very near to the entire Spanish blood ; evinced also by the following circumstances :

“ Like ewes of the Spanish breed, they are hornless ; whereas Wiltshire ewes, as well as rams, are well known to be horned sheep.

“ The fleeces are close compact ; equal in weight with the Spanish, and with them carry the same general exterior appearance.

“ In weight of carcase they are nearly similar to the Spanish.

“ The quality of the wool has been estimated, by competent judges, to be equal to the Spanish.”

“ I have made trial of the cross with Welsh ewes, and therefore can state, that a shearling ewe of the first cross, got by one of Lord Somerville’s rams,

produced a fleece weighing upwards of 6lb. unwashed, which in a scoured state would be fit for 3lb. worth perhaps 6s. per pound, or 18s.; much more than the value of its carcase as a store sheep. Its dam fatted would not exceed 8 or 9lb. per quarter, carrying a fleece of about 1½lb. The offspring is now the property of an intelligent member of the Society;\* and this breed is so much a favourite with him, that he has lately purchased some additional Welsh ewes to constitute part of his interbreeding flock."

"I rather regret that hitherto I have had no opportunity of making trial with very large sheep, such as the Lincoln, &c. I conjecture the fleece of the first cross would greatly exceed that of the ewe, and am persuaded the value of the wool per pound would be nearly doubled, still preserving perhaps a suitable staple as combing wool."

"Perhaps it may assist some of our correspondents to form an estimate of the expences attending the importation of Spanish wool, if I subjoin an account of a pile consigned to this country, by the well known firm of Francisco de Gorbeay, Sobrinas, of Madrid.

*"An Account of a Pile of Wool imported from Spain, with all the expences incident to it, in the time of peace.*

|                    | Arrobas | lb. |
|--------------------|---------|-----|
| Neat wool .....    | 2200    | 16½ |
| Skim ditto .....   | 75      |     |
| Lamb's ditto ..... | 276     |     |

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Arrobas 2551 16½

\* The Rev. B. Richardson.

**Sheep.**

**427**

**Runs Mrs.**

|                                                                                                                         |            |
|-------------------------------------------------------------------------------------------------------------------------|------------|
| At 110 rials of vellon per arrobas                                                                                      | 280,632 20 |
| <i>Runs Mrs.</i>                                                                                                        |            |
| 118 day's wages to receivers, at 8 runs . . . . .                                                                       | 944 0      |
| Making great and small bags, string, piling and unpiling, pressing the bags of wool in the dirty state and rolling them | 358 0      |
| 24 days to factor of receiving 15 run . . . . .                                                                         | 360 0      |
| Carriage to wash house and wine to carriers . . . . .                                                                   | 191 26     |
| Gift at commencement and conclusion, tobacco, wine, removing the low sorts washed, duty of Vudoris candles . . . . .    | 546 2      |
| Washing factory, 20 days wages, at 15 run . . . . .                                                                     | 300 0      |
| Cleaning arrobas 932, at 7½ rs. . . . .                                                                                 | 6,990 0    |
| 46 small bags of double maraga, at 10 rs. . . . .                                                                       | 460 0      |
| 194 bags exhausted in packages for wool                                                                                 | 116        |
| In bandages . . . . .                                                                                                   | 58         |
| In canal field, &c. . . . .                                                                                             | 20         |

**Bags 194 152,910 0**

**Carried over 293,742 24**



|                                       | <i>Runs</i>    | <i>Mrs.</i> |
|---------------------------------------|----------------|-------------|
| Brought over                          | 293,742        | 24          |
| 2 per cent. comm. on purchase and ex. | 5,874          | 30          |
|                                       | <hr/>          |             |
|                                       | 299,619        | 27          |
| Deducted for bad wool                 | 366            | 0           |
|                                       | <hr/>          |             |
| <b>Runs</b>                           | <b>299,253</b> | <b>27</b>   |

|                                                           | <i>Runs</i> | <i>Mrs.</i> |
|-----------------------------------------------------------|-------------|-------------|
| 299,252 27 which at 37½                                   | £3,229      | 4 10        |
|                                                           | <i>Runs</i> | <i>Mrs.</i> |
| Carriage 46 bags lambs' wool from Pedrazah ..             | 4,477       | 17          |
| Duties paid agent of proprietors on lambs' wool           | 5,765       | 23          |
| Duties paid agent of proprietors on 116 bags wool .....   | 43,561      | 0           |
| Charges and carriage to Berverana .....                   | 4,473       | 26          |
| Shipping 117 bags, at ¼ rial per bag .....                | 87          | 25          |
| Loading, weighing, marking, and enlarging, at 3¼ rs. .... | 499         | 17          |
| Thread and wrapper ....                                   | 132         | 0           |
| Public weight duty of 162 bags, at ¼ rial .....           | 81          | 0           |
| Consulado duty of 117 bags, at 2¼ rs. ....                | 292         | 17          |
|                                                           | <hr/>       |             |
| Carried over                                              | £3,229      | 4 10        |

|                                | Sheep  | Runs | Mrs. | £     | s. | d. |
|--------------------------------|--------|------|------|-------|----|----|
|                                |        |      |      | 3,229 | 4  | 10 |
| Brought up                     |        |      |      |       |    |    |
| Warehouse of 162 bags,         |        |      |      |       |    |    |
| at 1 rial .....                | 162    | 0    |      |       |    |    |
| Comm. on ditto, at 7½ rs.      | 1,215  | 0    |      |       |    |    |
|                                |        |      |      |       |    |    |
|                                | 57,657 | 23   |      |       |    |    |
| At 40 per dollar .....         |        |      |      | 638   | 1  | 9  |
| Insurance 2 guineas on         |        |      |      |       |    |    |
| £4,000 .....                   | £84    | 0    |      |       |    |    |
| Average freight and pri-       |        |      |      |       |    |    |
| mage, 10s. per bag ..          | 67     | 10   |      |       |    |    |
| Landing and all charges of     |        |      |      |       |    |    |
| warehouse .....                | 26     | 0    |      |       |    |    |
| Brokerage ¼ per cent. in       |        |      |      |       |    |    |
| London on £4,600 ..            | 23     | 0    |      |       |    |    |
|                                |        |      |      |       |    |    |
|                                |        |      |      | 200   | 10 | 0  |
| Total of costs and expences .. | £4,067 | 16   | 7    |       |    |    |

“ The arroba of Spain is equal to about 24lb. English avoirdupois; and 105lb of Spain is equal to about 100lb. English.

“ The immense loss on the import of foreign wool will be seen by the preceding account. Independently of the loss by fraud, the commission, and charges on the washing only, amount to upwards of 6½ per cent. and the subsequent duties and charges, including shipping and insurance, and the various articles detailed, are an increase on the original cost of no less than 25 per cent.”

Mr. King, who is a very opulent carcass butcher in Newgate Market, and a very considerable grazier likewise, assures me, that the cross which he has seen, between the Merino and South Down, has proved to be most valuable in point of carcass, and so delicate in the wool, that nothing short of the pure Spanish could vie with it. He has had some of the pure Merino breed at turnips and at grass in his marshes all the winter opposite Woolwich, which have been free from internal disease, or foot-rot, and have thriven extremely well; he has not the smallest doubt of their proving a great acquisition. The fleeces of some of these were put into my hands to be scoured, washed, and sorted; and although they were too high dried, and not otherwise well managed, because they were reduced from 27½ lb. the original weight of them, to 12 lb., whereas the R's, F's, and T's taken together, if they had been treated as the other fleeces were, would have averaged full 4½ lb. or 13½ lb. the three fleeces, and were valued at 6s. the pound.

As to the flavour of the mutton, a noble lord did me the honour to send me a joint of one, which although it was sent a distance of near 200 miles, proved to be in the opinion of some good judges, who partook of it, of most exquisite flavour, full of a rich juice, as tender as the most delicate lamb, and very far superior to any South Down mutton that is killed in this part of the county.

To prove farther how fat even a South Down sheep may be made, I recollect one that was bred by Mr. George Wheeler, of Brixton Causeway, which was fatted by Robert Tupp, Esq. of Hels-

den Green, in Middlesex, and killed in 1804, by Mr. Walrutter, carcase butcher, in Newgate Market, which at four years old, had 56lbs. of fat, viz. 29lbs. of loose fat, and 27lbs. about the kidneys. The wool was also equal to the very best of any South Down in that county.

It appears from the most indubitable proofs, that any wool, be its original quality what it may, will be considerably reduced in value, by washing it after the sheep is dead; because the water is found to thicken it so much, as no subsequent skill or operation can remove. Whereas, when the fleece is washed on the back of the sheep, the natural warmth of the animal's body insensibly dries up the humidity of the water; its pristine elasticity is recovered in a very short time, and the fleece in the interval between washing and shearing, acquires its former silkiness and quality; with the advantage of being so much purer and cleaner. This curious fact is scarcely known to the most intelligent flock-masters, but is sufficiently proved by the daily experience of the woolstapler, and the difference between the price of skin-wool and fleece-wool.

#### DISEASES IN SHEEP.

*The foot-rot* prevails to a great excess in the parishes of Horley, Burstow, Charlwood, and indeed all along that line of country; and a butcher at the former place assured me that the sheep were scarcely ever free from it for any length of time, owing as he said, to the great degree of humidity

prevalent, as well in the inclosed grounds as on the commons, indeed they are completely water-locked six months at least in every year. The disease is attributed to a maggot which eats its way into the joint above the foot, and by making an orifice the dirt and wet is always getting in, producing first a foulness and then putridity, which if not taken in time would destroy the foot. As soon as it is discovered, it is cut out, and bathed with a solution of brown spirits, or caustic lime, or butter of antimony, and afterwards bound up. The disease is said to be so contagious, that a flock of sound sheep, depasturing where the diseased sheep have been, will take the infection.

*The scab* also prevails in those parishes; for this a decoction of tobacco, turpentine, sulphur, and verdigris rubbed on the parts affected, or mercurial ointment, will effect a cure.

*The rot, or broncocele* is a dangerous disease, evidently arising from too great humidity in the soil, and from noxious weeds and plants, and in some seasons prevails to an alarming degree in the low and heavy parts of the county, insomuch that many sensible farmers have of late years foregone the advantages of their dung, &c. on account of this cruel malady; instead of which however they ought to have set about laying their lands quite dry, and having more pasture and less arable. The *ranunculus flammula*, (the flame coloured crow's foot,) which always abounds in those moist soils, is thought by many to cause the rot.

The following remedy has been prescribed: Take Roman wormwood and Spanish radish, (black,)

equal parts, and reduce them to a powder; to 2 ozs. of this powder, add 4 ozs. of pounded juniper berries, 7 or 8 lb. of meslin of oats, &c. a handful of salt, and  $\frac{1}{2}$  lb. of common wormwood powder, let them be well mixed together, and put them into troughs where they can feed on it. This quantity is sufficient for 100 sheep, and they should have a dose at Michaelmas, another at Easter, and another in June, which, it is said, will cure those which are already seized with it, and prevent others from taking the disease. Buckbean (*menyanthes*) is supposed to have the same effect in curing the disease.

*The goitre* (*hernia gutturis*) is a disease in the throat which occasions it to swell, and be otherwise much inflamed; if not speedily relieved they commonly die in six or eight days.

*The red water* is often cured by timely bleeding, which some perform in the foot, while others recommend doing it under the tail.

It is strongly recommended by some of our largest sheep farmers to bleed sheep a few days before they are put to clover or tares. It is a practice confined to very few. Mr. Ashby always did so. Ailing sheep should always be separated from the sound.

As every man who is a sheep farmer breeds or keeps them to enrich his farm as well as his pocket, so when he draws them out for the fair or the market, he commonly takes care not to affix a mark on their foreheads indicative of their unsoundness. Our buyers, whether they be farmers or dealers, not choosing to depend altogether on the asseveration of the seller that they are sound, always enquire

among strangers from what part of a particular county they come, and they proceed to an examination of the sheep individually, in the following manner: "Placing the head between the legs of the examiner, he examines the eye with great caution, which ought to be bright and cheerful, the white pure and without spot, the strings a bright red; his gums also should be red, his teeth white and even, the skin on his brisket, as well as on his shoulders where there is no hair will be red, his skin loose not tough, his wool firm to his body: his breath pure and long, and his feet cool. But should his eyes be heavy, pale, and spotted, his gums and breast white, his teeth yellow and foul, his wool separating easily from his body; these are indications of unsoundness, and if opened, his belly will be found full of water, his fat yellow, his liver putrid, and his flesh flabby and waterish.

The following is the method very ably described by Dr. Harrison: When the shepherd determines to examine the eyes of a sheep, which ought to be done frequently in low moist grounds, and in seasons unusually wet, he should place it between his thighs, and hold the head with both hands. He then proceeds to raise the upper and depress the under eye-lid; by which means the blood vessels of the tunica albuginea are brought into view. When they are red, and in great numbers, the sheep is supposed to be in good health. The caruncula lacrymalis, and inner surface of the eye-lids, should be as red as the vessels on the eye-ball. If they are pale, and the veins are in small quantities, and faint coloured, or livid, the sheep is in a debilitated state, or afflicted with the rot. In all

cases, where the blood vessels have entirely disappeared, the mutton is bad.

I shall now take the liberty to lay before my readers a few passages from Dr. Harrison's Enquiry in the Rot in Sheep; which work I most strongly recommend to the attention of the numerous persons who are interested in that very important subject.

*Dr. Harrison's History of the Rot in Sheep.*

“ When in warm, sultry, and rainy weather, sheep that are grazing on low and moist lands, feed rapidly, and some of them die suddenly, there is reason to fear that they have contracted the rot. This suspicion will be further increased, if a few weeks afterwards the sheep begin to shrink, and become flaccid in their loins. By pressure about the hips at this time, a crackling is sometimes perceptible. Now, or soon afterwards, the countenance looks pale, and upon parting the fleece, the skin is found to have exchanged its vermilion tint for a pale red; and the wool is easily separated from the pelt. As the disorder advances the skin becomes dappled with yellow, or black spots. About this time, the eyes lose their lustre, and become white and pearly, from the red vessels of the tunica adnata, and eye-lids being contracted or entirely obliterated. To this succeeds debility and emaciation, which increase continually till the sheep die; or else ascites, and perhaps general dropsy, supervene, before the fatal termination. These symptoms are rendered more severe, by an obstinate purging, which comes on at an uncertain period of the disorder. In the progress of the complaint,



sheep become what the graziers call chockered, i. e. affected with a swelling under the chin, which proceeds from a fluid contained in the cellular membrane, under the throat.

“ In five or six days after contracting the rot, the thin edge of the small lobe of the liver becomes of a transparent white or bluish colour, and this spreads along the upper and lower sides, according to the severity of the complaint. Sometimes it does not extend more than an inch from the margin. In severe cases the whole peritoneum investing the liver is diseased; and then it commonly assumes an opaque colour, interspersed with dark red lines or patches. The upper part of the liver is sometimes speckled like the body of a toad, to which it is said to bear a striking resemblance: round the ductus communis choledochus, and hepatic vessels, a jelly-like matter is deposited, which varies according to the severity of the attack, from a table spoonful, or less, to five or six times that quantity. Upon boiling, the liver loses its firmness, and separates into small pieces in the water, or remains soft and flaccid.

“ Several graziers and butchers, with whom I have conversed at different times, having observed that sheep are much disposed to feed during the first three or four weeks after being tainted, omit no opportunity of producing it to increase their profits. When the first stage is over, flukes begin to appear in the pori biliarii, the ductus communis choledocus, and in the gall-bladder. At first, the quantity of these creatures is small; but as the disease advances, they increase, and before death, are often very numerous. In the last part of the com-

plaint, they are sometimes to be found in the stomach, as well as in the intestines and liver. This, like the visceral disorders of the human body, may terminate in resolution—effusion—suppuration, or *schirrus*.

1st. “The complaint is said to terminate in resolution, when the inflammatory action goes off, without destroying the state and texture of the parts. However, I am strongly inclined to believe, that every considerable inflammation in the human body, and in other animals, although it ends in resolution, leaves behind it some remains, which may be discovered by an experienced anatomist. When the vessels are thrown into inflammatory action for a few days only, effusion commonly takes place, and the coats become thicker, and assume a buffy colour. These changes in the sanguinary system often continue through life, and lay the foundation of many chronic and incurable disorders. Sheep that recover from the rot, exhibit very different appearances after death, according to the severity of the attack; but the taint is seldom or never entirely removed. I was desired, within these few days, to look at the liver of an old ewe, that died fat, and contained fourteen pounds of suet in her body. The back part of the small lobe was dappled with whitish spots; the coats of the ductus communis and pori biliarii were considerably thickened, and more solid than usual. In colour, they resembled the human aorta in old people, and were full of flukes: in other respects, the liver appeared to be sound and natural. The butcher asserted, that the variegated appearance and alteration in the ducts,

were occasioned by a slight taint of long standing, which had not been considerable enough to disorder the economy, or impair the health of the animal, sufficiently to prevent its feeding.

2dly. " When sheep die suddenly in the first stage of the disorder, an effusion of serum, or of wheyish coloured fluid, may be commonly discovered in the cavity of the abdomen, and then the peritoneum surrounding the liver is generally covered with a membrane or coat of coagulable lymph. This form of the rot has been frequently confounded with the resp or red water, though it differs from the latter disorder, in the colour of the effused liquid, in being much less disposed to putrefaction, and in several other particulars.

3dly. " Abscesses in the liver exhibit another termination of this malady. They are seldom considerable enough to kill immediately; but, in consequence of the absorption of purulent matter from them, the sheep frequently waste away, and die hectical or dropsical. When the collections are small, sheep will recover sufficiently to bear lambs, for three or four seasons, and afterwards become tolerable mutton.

4thly. " The most common termination is in schirri, or what the shepherds call knots in the liver. I have seen the whole substance of this important viscus so full of small roundish lumps, or schirrous bodies, that it was difficult to find any sound part in it. The first attack is unfortunately so very insidious, that the disorder is scarcely observable, before the animal begins to waste and lose flesh. In this advanced state, it is said to labour under

the rot or *pourriture*,\* from overlooking the commencement of the disorder.

“Hydatides are observed to affect schirrous and purulent livers more frequently than others. When livers are much diseased, the butchers carefully conceal them from the public eye. To me, it is always matter of surprise, to find the mutton saleable in these severe cases. It shews, in an extraordinary manner, the accommodating power of living matter, which is able to maintain life, and increase corpulence, under such unfavourable circumstances. Shepherds and breeders, who make it a general rule to kill every sheep that becomes indisposed, from an opinion that very few of them ever recover from any illness, would do well to examine the livers and other viscera of slaughtered sheep. By such a practice, they would soon be convinced, that sheep are able to endure a great deal. I am persuaded, that the uniform mortality among them, proceeds more from ignorance, or erroneous treatment, than the inevitable tendency of their disorders. This inquiry would point out in a forcible manner, the necessity of encouraging some medical person of good reputation, and considerable experience, to turn his attention to the numerous maladies of these useful animals. The diseases of horses have of late years been regularly studied in most parts of Europe; but to Britons, surely no veterinary object is more deserving of encouragement than the management and health of sheep, with which our unrivalled commerce and national glory are so inseparably connected. ‘*Les plus grands medecins*

\* See Obs. et Inst. sur les Malad. des Animaux Domestiques.

doivent rechercher avec soin la cause et le remède d'un mal, qui menace de détruire des animaux utiles à toutes les nations; et principalement à celles qui savent employer la laine pour les plus beaux ouvrages.' DAUBENTON."

"The rot in sheep has been frequently contracted, in a quarter of an hour, by feeding upon marshy or moist lands, in hot weather. This information does not rest upon a single testimony. In the county where I reside, most butchers occupy some land, and are, in consequence, well qualified to discover the causes and early symptoms of this disorder. To them it is well known, that for a few weeks after being tainted, sheep thrive more than at any other period: this complaint is often, therefore, purposely induced for the sake of increased emolument. 'Les moutons qu'on veut vendre ou consommer dans le pays, sont conduits, lorsqu'ils approchent du moment de cette destination, sur les pâturages qui avoisinent les étangs, ou sur les autres lorsqu'ils sont couverts de la rosée & pendant les pluies: on sent que ceux de ces animaux qui sont ainsi nourris prennent bientôt un embonpoint marqué, mais il est de mauvaise nature, & est un acheminement à la pourriture.\*'—"

"Many years since, the grandfather of Mr. Harrison removed ninety sheep, from a considerable distance, to his own residence. On coming near to a bridge, which is thrown over the Barling's river, one of the drove fell into a ditch, and fractured its fore-leg. The shepherd immediately took it in his arms to a neighbouring house, and replaced

\* See also Instruc. et Observ. sur les Maladies, &c. ann. 1790.

the limb. During this time, which did not occupy more than one hour, the remainder were left to graze in the ditches, and lane. The flock were then driven home, and in a month afterwards, the other sheep joined its companions. The shepherd soon discovered that all had contracted the rot, except the lame sheep; and as they were never separated upon any other occasion, it is reasonable to conclude, that the disorder was acquired by feeding in the road and ditch bottoms."

"I could state several more cases, of the same kind; but as those which have been related are sufficiently numerous, and can be attested by respectable witnesses, I do not think it necessary to swell the account by further evidence, in support of my opinion. From the various circumstances enumerated above, I think I am justified in attributing the rot in sheep, and other animals, to paludal effluvia; but with respect to their nature and constitution, it is very difficult to form any rational judgment, as they have hitherto eluded the most subtile and delicate inquiries. It must, however, be admitted, *si causa latet vis est notissima*; and consequently the subject, from its great importance to the public in general, is entitled to a serious investigation."

### *Prevention of the Rot.*

"It is confirmed by experience, that whenever any place is laid dry by judicious management, it ceases to occasion the rot.\* For my own part, I

\* See Letters, &c. selected from the Bath and West of England Society, vol. i. p. 341.

am acquainted with many sound parishes, which, during their open state, were so injurious to man, and to other creatures, that I cannot sufficiently impress upon my readers the importance of effectual drainage, for the preservation of health. When, from circumstances, the land cannot be laid dry, during the summer months, it requires to be occupied with great caution, since moist grounds are the most prejudicial and dangerous to animal life. I have had occasion to observe, that miasmata are produced in some way or other by the sun's action upon moist ground, and, therefore, when it is well covered with grass, early in spring, we have less danger to apprehend, provided we maintain a deep herbage, till the commencement of frosty weather."

"Mr. Young, of Claxby, is of opinion, that when land is well covered with grass, it becomes less dangerous to cattle. In 1792, he divided a flock of sheep, and placed fifty upon some good aftermath, where, in other seasons, the rot had frequently prevailed. Only this part of his flock escaped the disorder, which he attributed to the meadow not having been grazed, before it was well covered, and defended from the weather."

"Luxuriant pastures seldom rot, unless they be eaten bare in hot weather. Whilst the ground is well concealed, it is so completely defended and protected, that the sun exerts no deleterious effects upon it. In the fatal year, so often particularized, Mr. Elmhirst, of Bag Enderby, an experienced and zealous agriculturist, who occupied two hundred acres of land in the parish of Croft, near Wainfleet, sold all his heavy beasts, and many sheep, early in the summer. His pastures were

thinly stocked with sheep only, during the rest of the year. The rot was extremely destructive in all the adjoining pastures, yet in his closes it never appeared. This exemption from the general calamity of his neighbours, he attributed partly to his land being always well covered with grass, and partly to his grazing during that summer entirely with sheep. In wet weather beasts and horses, by treading the ground, leave foot-marks, where the water stagnates, and in consequence of it, as he believes, the rot is produced. In justice to the testimony of Mr. Elmhirst, it may be proper in me to add, that he has been an active and judicious cultivator of land on a large scale, for a great number of years. Every observation of his is therefore entitled to particular attention.

“ I have remarked, that sheep are most liable to rot immediately after losing their fleeces; and in the month of November, when the cold first begins. No rot can be contracted without warmth, or in spring, before the sun’s influence is become considerable: but when the disposition is once acquired, it can only be subdued by frost, or a long succession of cold weather. Gabriel Plats assures us, with confidence, derived from the experience of seventy-four years, that the only infectious months that beget the great rot, are May and June, when excessive moistures befall those months.\* In a few instances, it has appeared in April, when showery weather and great heats have prevailed. In ordinary years, meadow may be irrigated till May, without any injury to the occupier. In doubtful

\* See Boyle’s Works.



cases, the generation of miasms will be effectually restrained, by continuing a copious and regular watering, till the grass is well grown. The late Mr. Bakewell was of opinion, that after May day, he could communicate the rot at pleasure, by flooding, and afterwards stocking his closes, while they were drenched and saturated with moisture. In summer, rivers and brooks are often suddenly swollen by thunder storms, so as to pass over their banks, and cover the adjacent low lands. In this state no injury is sustained during the inundation ; but when the water returns to its former channel, copious exhalations are produced from the swamps and low lands, which are exceedingly dangerous to the human constitution, and to several other animals, as well as sheep. I formerly mentioned, that during the summer, Mr. Harrison could give the rot to his sheep in a few minutes, by grazing them upon the moist soft land, from which the water of the Barlings had just retired. While there is any current, the sheep will never become tainted, although they often wade in search of their food."

" When miasmata are once formed, they preserve their noxious powers and destructive influence unimpaired, till the cold weather puts an end to their force and activity. In mild seasons, epidemic diseases have been known to afflict the human constitution, during the greatest part of winter ; and the pastures which have once become unsound, are only to be recovered by the setting in of frost, or a succession of cold days and nights.

" The autumn and winter of 1799 and 1800 were remarkably mild and warm. At Candlemas time, sheep that were pasturing on the fen and commons

at Walshingbrough, near Lincoln, took the rot, and died in the following autumn. No farmer in that parish recollected to have suffered at any other time, from the rot in spring. Mr. Thompson of Horncastle, informs me, that many years since, his brother occupied a low wet close in the parish of Hatton, and lost all his sheep, before winter, of the rot. From that time the land remained unemployed till about Candlemas. It was then filled with strong healthy sheep; but they were all rotten and many of them dead before the following May day. He recollects that there was very little frost during that winter, and consequently the effluvia were kept alive by the abundance of the herbage. Plats gives it for an infallible symptom, that when bees fail, and their hives feel light, a great rot of sheep is to be expected; which gives a very seasonable warning to bleed the sheep under the eye, or in the mouth, as oft as they see occasion in the end of summer, or in autumn; or to accustom those which are suspected, to lick salt in troughs, or to take some brine with dry food, as they may easily be trained to it by gentle degrees; or to force down a dose of salt, as is directed.\*

“Where necessity requires the pasturage of moist grounds in summer or autumn, the shepherd ought carefully to remove his flock into a dry situation before the evening, and provide them with corn, and good hay, or green food.”

“It is confidently asserted, that decoctions of bitter herbs, with salt, have frequently preserved sheep from the rot. Salt is supposed to constitute

\* See Boyle's Works, vol. vi. p. 356.

a part of Fleet's celebrated nostrum: and we know, that bitters are deservedly recommended to prevent intermittents, the dysentery, and other disorders, which originate from exhalations.

" In Oxfordshire, Dr. Lower has frequently known six or seven spoonsfuls of strong brine and stale urine, with soot steeped in it, to be given with great success. This is done at spring and fall of the year, when the dew is counted most dangerous. This course of physic is continued eight or ten days, or till the sheep eat their meat heartily; and if they were taken in time, there seldom died any in a whole flock. For the same purpose, Ellis recommends the following medicine in his *Practical Husbandry* :

" 'Take a peck or better of malt, and mash it as though you would brew it into ale or beer, and make eleven or twelve gallons of liquor; then boil in it a quantity of shepherd's purse, comfrey, sage, plantain, pennyroyal, wormwood, and bloodwort; add yeast, and afterwards salt to the mixture: then turn the liquor into a vessel. After April comes in, give seven or eight spoonfuls to every sheep, once in the week, if the weather be wet, and if dry, not so often.' "

" It is generally admitted, that ploughed fields well laid down with grass seeds, are not in much danger for the first two years. After this time the herbage gradually declines, and, in consequence of it, sheep become liable to the rot."

" The injurious effects of marshes and swampy districts may therefore be moderated, by planting rows of early and late growing trees, to intercept the vapours, and supply oxygen to the atmosphere.

" I am of opinion, that the generation of noxious exhalations may be restrained in some measure by judicious husbandry, and by covering the ground with marl or lime. Whether the same object can be effectually obtained by animal manures or other means, is a matter concerning which I am not sufficiently informed; but since judicious drainage constitutes the basis of agriculture, and contributes essentially to the preservation of animal life, I would recommend this system to be vigorously prosecuted in all moist situations."

" De toutes les maladies qui affectent le mouton nulle ne porte plus de prejudice à la laine que la pourriture, elle en detruit l'adherence et le ressort; en sorte que la toison reste seche et cassante quelque soit d'ailleurs sa beaute et sa finesse. *Inst. et Obs. sur les maladies des animaux domestiques, Anno 1791.*"

Lord Somerville says, " salt is not given to sheep in Prussia, and in Holland; but in Sweden, in Saxony, in Silesia, and in France, it is considered a most important article, and is strongly recommended on the same principle as we had before laboured to induce its adoption in these kingdoms."

*Wool.*—At Lewes fair, July 26, 1803, South Down wool sold for 60s. per tod of 32lbs.

At Lewes fair, July 26, 1804, South Down wool sold for 64s. per tod.

My Lord Sheffield sold some on the same day for 65s. per tod.

In 1803, Spanish wool, from 6s. 6d. to 6s. 9d. per pound.

In 1804, English Merino breed, at 6s. 3d.

One pound of pure Spanish wool has been spun into 12,800 yards of yarn, by Mrs. Read, of Ebley, Gloucestershire.

Pitch mark wool has been used as a manure for wheat, by Mr. Witts, of Ockley, in this county.

Curtis, in his *Flora Londinensis*, recommends the lady's smock, (*cardamine pratense*) wild thyme, (*thymus serpyllum*) as proper for sheep walks. Sainfoin is known to be excellent for them, either green or made into hay. They are very fond of the ox-eye daisy, (*chrysanthemum*.)

For the introduction of this great staple the woollen manufactory, every farmer and every clothier with the immediate and ultimate dependants on them, have great reason to venerate the name of Edward III, who, struck with the flourishing state of the Flemish and adjacent provinces, wisely endeavoured to excite a spirit of industry among his own subjects, who, blind to the advantages of their situation, and ignorant of the source from which opulence was destined to flow into their country, totally neglected commerce, and did not even attempt those manufactures, the materials of which they furnished to foreigners. By alluring Flemish artisans to settle in his dominions, as well as by many wise laws for the encouragement and regulation of trade, he gave a beginning to the woollen manufactures of England, and first turned the active and enterprising genius of his people towards those arts which have raised the English to the first rank among commercial nations.

Mr. King, in his *Essay on Trade*, estimates the value of the wool shorn to be £2,000,000 per annum. It is computed by a general medium, that

the material is improved one with another four-fold in the workmanship, so that the value of the woollen manufacture made here may amount to £8,000,000, this was supposed to be the case about the beginning of the last century. If we compare this account with the evidence given on passing the last wool bill, that the clip of England and Wales, amounted annually to about 600,000 packs, or 144,000,000 pounds weight, which sell at ten-pence per pound, and produce £6,000,000 sterling, and if we observe the before-mentioned computation, the improved value of the wool thus wrought up will produce no less than £24,000,000, a sum so extraordinarily great as to shew the wonderful improvement and increasing prosperity of this country, in the course of one century, as nothing can be put in competition with it in any other country whatever.

Whatever goods we make up of foreign materials, and sell in the markets abroad, all above the cost of the materials is clear gain to England; in the same manner all our clear returns from the plantations which we export are neat profit.

But where the materials and the manufactures too are both our own, as in this instance of the woollen goods, six millions carried out or exported, which is the calculation I have made (not having the means immediately to ascertain the fact) when the general balance of trade is considered, must be esteemed as six millions gained to the kingdom; for the return of this exportation supplies our consumption of foreign goods, which would otherwise be bought with money, with some surplus, which

surplus is what must incline the scale to turn in our favour.

If therefore under the present state of the agriculture of this country, we can produce a material which, as we have seen, can be improved to the value of £24,000,000 by workmanship, and that too among our own artisans, is it not reasonable to suppose, by inclosing all the wastes, that such of them as are calculated for the production of wool might be so improved, and that the wool itself may be so advanced in quality and quantity, as that the increased amount would be at least £36,000,000? I think it is not only probable, but it is very possible that in the course of this century, the grand total might be improved to £50,000,000, provided there can be a consumption for so large a sale. Is not this consideration then sufficient to open our eyes to interests so great? And if the idea which was entertained by that eminent divine, Bishop Burnet, was correct, which I think subsequent experience has proved it to be so, "that nature had adapted different countries for different manufactures; that cold and moister climates are fitter for the working up of wool, because there the sun does not exhaust the natural moisture, nor make it brittle, which would render it ill to work, and bad to wear," it will perhaps in some measure account for our vast superiority and success in the manufacture of woollen goods, and ought to be an additional stimulus to us to set about so great an improvement without delay. Lord Verulam, in his Essay on Riches, says, "The improvement of the ground is the most natural obtaining of riches,

for it is our great mother's blessing, the earth's, but it is slow; and yet where the men of great wealth do stoop to husbandry, it multiplieth riches exceedingly. I knew a nobleman of England, that had the greatest audits of any man in my time: a great grazier, a great sheep master, a great timber man, a great collier, a great corn master, a great lead man, and so of iron, and a number of the like points of husbandry; so as the earth seemed a sea to him in respect of the perpetual importation."

There are certain regulations ordained by various acts of Parliament relating to wool and sheep, and as there have been a great number of convictions, and very severe fines levied on several farmers in the counties of Sussex and Kent, this and the last two years respecting wool, it would be well for every sheep farmer to be possessed of those acts for their guidance, as they may unintentionally commit a breach of those acts for want of knowing their particular objects. These statutes are 9th and 10th Will. c. 40, and 28th Geo. III. c. 38, (the latter may however be generally sufficient for the purpose,) these statutes relate principally to the woollen manufactory.

#### LAMBS.

Esher, Walton, and that neighbourhood, were formerly famed for their house lambs, and the celebrated Mr. Duckett was the leading breeder. Of late years the practice has declined, and I now learn that the carcass butchers of Leadenhall and Newgate markets receive large supplies from the



more interior parts of the country, but from whence particularly my informant could not say, but Essex is thought to be one of the places; they are sold by these people at a price somewhat below what our farmers used to charge, and therefore they now pay less attention to it. Such, however, as are bred in the county, are from the most choice Dorset ewes, procured with great care and industry, because on the whiteness and delicacy of the meat, as well as their forwardness, depends the value of the lamb.

With regard to the mode of treatment in Surrey, it will be found to differ scarcely in any respect from that pursued in Middlesex, and so correctly detailed by Mr. Middleton.

Grass lambs are an important article in the farming economy of Surrey; and numbers are sent every week to supply the luxurious appetites of the wealthy inhabitants of the metropolis. Guildford, and its vicinity for some distance, appears to take the lead in this branch of the profession on the western side of the county, as Oxted, Limpsfield, &c. do on the eastern side. Mr. Street had, on the 3d of February 1803, several fine lambs fit for the butcher, then at turnips, and it was the opinion of my Lord Grantley, Mr. Barrett, and his lordship's bailiff, who accompanied me to view them, that for the time of year they were unusually large and fine. One, particularly fine ewe attracted all our attention, it was the largest and the fattest Dorset we had ever seen, full-mouthed, and was judged to weigh 28lb. at least per quarter; indeed she was so much like a Leicester of the best breed,

that had she had no horns, and more wool, she might have passed for one.

My Lord Grantley favoured me with the following account of the produce of his grass lambs:

In 1800, his lordship bought 45 Dorset ewes, at 27s. 6d. each; they lambed down early, were put to turnips in the fold, and on the Good Friday following they were sent to Smithfield, and sold as grass lambs, where they averaged fifty shillings each, some few prime ones sold for £3. 3s. each. The ewes were continued on turnips as long as there were any, and then sold fat at 48s. each, so that each ewe, with her produce, netted in about six months £3. 10s. 6d. after deducting the prime cost. This was good farming certainly.

#### SWINE.

Exclusive of those which are fed at the distilleries and starch-makers in this county, prodigious numbers are kept by the several gentlemen, farmers, shopkeepers, cottagers, and the like; of this we have sufficient evidence, since in the town of Guildford alone there are slaughtered from 30 to 40 during the killing season per week, and many also when they are out of season; these I understand are for the consumption of the inhabitants, and the immediate neighbourhood; taking it therefore for the six winter months alone, I conceive that at least 1500 are killed there.

In collecting the several quantities that are slaughtered in all the other market towns, villages, &c. including the distilleries, &c. but excluding

the Borough of Southwark, I am of opinion that not fewer than 20,000 hogs of one age, or the other, are killed in the county per annum, and of this number perhaps one-third are sent to the victualling office either dead or alive.

The breed in some districts of this county has some claim to notice, if it has no other characteristic properties; and this notice arises from a propensity to fatten, and to arrive at enormous weights at an early age. Besides those at Rudge-wick, and that immediate neighbourhood, the parish of Godstone also claims our attention. In the former place it is no uncommon thing to see them attain to one hundred weight and upwards (the weight of a large fat Sussex ox) but many of them run from 70 to 90 stone at two years old. Mr. Langridge, who occupies a farm in the parish of Godstone, has I believe the same breed or something like it. I saw one there that was going to be killed, owing to an accident that it had met with, which prevented its fattening kindly, and it was then considerably above 80 stone.

But what are all these compared to that one which has been fattening at Mr. Warde's, at Squirries Park, Westerham, under the direction of Mr. Sandiland, the steward, which, at three years old, weighed at Christmas 1804, the inconceivable and enormous weight of 182 stone; and if there was no mistake (and my information came from Mr. Sandiland, with whom I am well acquainted,) it is such a creature as we may never hear of again. I have very often seen it during the last two years, but I do not think that it has gained much flesh.

fat during the latter twelve months. Its food was chiefly ground barley.

A very good sort has been many years kept at Woodmanstone, which, with very little additional feed than what it could pick up at the barn door, will at two years old weigh about 40 stone. The breed has something of the Berkshire in it, and I think a little of the China. The body is shorter than the true Berkshire, and it stands lower also, it is thicker across the loin, the ears small, but the head rather large and long, the flesh nicely veined and well-flavoured, the skin thin, the colour black and white; but the black is in huge blotches rather than spots. The original came out of Sussex.

The China with the Yorkshire (East-riding) cross particularly, but with many other sorts also are much in fashion among our gentlemen, opulent tradesmen, and even among some of our farmers. They are a nice delicate breed, very prolific, fat kindly, and weigh from 16 to 20 stone.

#### POULTRY.

From the magnitude of the commons in this county, it may be presumed that geese form a prominent feature on them. The fact is so, for in looking over my notes, I find that including those which are kept by farmers on their own premises, and by cottagers on small patches of waste, greens, and the like, the quantity reared is not less than between 5 and 6000 annually; of late years the produce has been scanty, owing to extreme wet and cold blowing weather, which carries them off by

wholesale. On Horley Common alone full three-fourths have died before they were six weeks or two months old. They are not kept for their feathers as in Lincolnshire, but for sale at the markets in the neighbourhood.

In fowls we also abound, and we possess a breed peculiar to the county, and for which Dorking has long been celebrated; they are a large handsome bird, perfectly white, having five claws (all the other sorts have only four) to each foot.

The inhabitants are so choice of them, that they charge nearly 100 per cent. more for a live bird, than for a fat dead one. From their size and make, they are peculiarly calculated to become capons, and a great many are thus prepared. The trade round the town in these two articles is prodigious, but to what extent I am ignorant, as I could obtain no data to go upon.

Ducks are a most serviceable bird upon a farm, and though many are kept which find their way to London through the higlers, yet they should be increased a hundred fold, in order that slugs, and other destructive insects and animalculæ might be destroyed.

END OF VOLUME FIRST.











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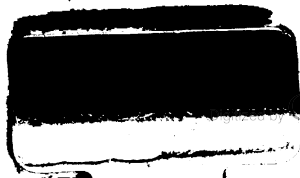


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